Commercial Fisheries Abstracts

monthly summary of important developments for the fishery industries

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PACIFIC OCEANIC FISHERIES
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Vol.6 No.1 January 1953

Fish and Wildlife Service
U.S. Department of the Interior
Washington D.C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, Secretary

FISH AND WILDLIFE SERVICE
ALBERT M. DAY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

EDITORS

A. W. ANDERSON, Chief, Branch of Commercial Fisheries

Wm. H. DUMONT, Chief, Educational and Market Development Section

ASSOCIATE EDITOR

MAURICE E. STANSBY, Chief, North Pacific and Alaska Technological Investigations, Seattle

ASSISTANT EDITOR

ROY C. STEVENS, Fishery Products Technologist, Seattle

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The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0 General and theoretical
1 Fish by species
2 Fresh fish
3 Preserved fish
4 Oils
5 Vitamins
6 Fishery by-products
7 Analytical Methods
8 Composition
9 Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1950

2.8 YOU CAN SELL FISH WITH FISH COOKING DEMONSTRATIONS

Seifert, Robert (Educational and Market Development Section, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington, D. C.)
Fishing Gazette 69, No. 10, 41, 115 (October, 1952)

The sales technique of "show 'em and give 'em a sample" has been proven again by the results of the fish cookery demonstration program conducted during the past several years by the Educational and Market Development Section of the U. S. Fish and Wildlife Service.

Because of the potential market for fishery products that exists in the Nation's schools, the efforts of the Service have been concentrated in this field. One billion lunches are served annually to school children under the National School Lunch Program. This market alone is sufficient to absorb at least 40,000,000 pounds of edible fishery products a year if fish is served only once a week. The actual use of fishery products in the school lunchrooms has been estimated to be only half of the potential consumption.

As a means of remedying this situation, the Section, up to January 1, 1952, had presented 365 fish cookery demonstrations attended by 20,000 persons in 28 states. These 20,000 persons serve lunches in their schools to over one million children every school day.

That these fish cookery demonstrations have resulted in an increase in the use of fish in the schools is shown by the bar graph (Fig. 1), which gives the percentage of increase in school use of fish in certain states. The percentage of increase was obtained by surveys made before and after the demonstrations, when conditions made such surveys possible.

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 ABSTRACTER: Kathryn L. Osterhaug

2.14 ELECTRIC TUNA FISHING

Anonymous
Atlantic Fisherman 33, No. 9, 9 (October, 1952)

Electric tuna fishing in Scandinavian waters has now been tried by Swedish fishermen. It is considered such a success that it may revolutionize tuna fishing, according to American Embassy at Goteberg.

Tuna caught in Scandinavian waters can reach a weight of about 800 lbs. and are difficult to boat after they are hooked. It is estimated that nine out of ten fish are lost while being hauled on board, but with new method all hooked fish can easily be hauled on board.

Equipment used is very simple and easy to manage. It consists of one motor converter receiving its current from an accumulator. Small hooks are used. When fish has been hooked it generally turns around and, when lying parallel with line, starts running out to free itself. When it turns, it comes into electric field developed by poles in hook and line. Fish becomes temporarily unconscious and can easily be hauled on board.

Equipment generally consists of three lines with small hooks baited with mackerel and kept at required depth by floats. When floats show that fish has been hooked, current is turned on and fish hauled in. Fish has to be killed immediately when on board as it does not remain unconscious very long after current has been cut off.

This electrical method appears to save manpower, as two men can fish with three lines and haul one fish on board simultaneously, whereas by old method it required at

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 Reprinted in whole

2.14 METHODS OF CAPTURING FLYING FISH

Wiles, D. W. (Fishery Officer, Barbados, British West Indies)
Proceedings of the Gulf and Caribbean Fisheries Institute, Fourth Annual Session, pp. 99-101 (April, 1952)

In Barbados the flying fish industry constitutes over 80% of the fisheries. The species sought is Hirundichthys speculiger which averages about one-third of a pound in weight. These fish are captured from sailing boats of 22 to 26 feet in length fishing from five to seven miles offshore. The boats have extra large mainsails and jibs and consequently are quite fast. They generally put to sea early in the morning and follow the prevailing current, where the fish are believed to be concentrated. The method of fishing is to chum the fish with "foul smelling bait" which is hung over the side of the boat in a basket. Cottonseed or coconut oil is then spread on the water to calm the surface and make it possible to see the fish as they rise to the surface. The fish are then caught with small (#14 or #12) hooks, or captured in dip nets. Five to nine fish are usually caught per dip of the net.

In December 1949 a government research boat was added to the Fishery Department in hopes of finding better methods of locating the fish. The author was in charge of this investigation. After several weeks of using the original method of capturing the fish, new experiments were tried. Plankton was studied and certain planktonic crustaceans and the larvae of the sea urchin were found to occur wherever good fishing was encountered. By using these organisms as an indication of the presence of flying fish the government was able to catch considerably more fish per unit of effort than the average of the local fishermen.

(over)

 ABSTRACTER: Keith A. Smith

2.1120 THE GEAR DEVELOPMENT PROGRAM OF THE M-V OREGON

Bullis, Harvey R. Jr. (Fish and Wildlife Service, Pascagoula, Mississippi)
Proceedings of the Gulf and Caribbean Fisheries Institute, Fourth Annual Session, pp. 101-102 (April, 1952)

Up to 1940 the snapper and shrimp fishermen of the Gulf Coast had made little change in their gear since the inception of the fisheries. The locations of snapper fishing grounds were kept secret by the "old timers" who used only dead-reckoning methods in approaching these areas. Thus it was extremely difficult for newcomers to break into the field. Up until the shrimp discovery off Key West in 1950 the various shrimp fisheries operated in their own areas quite independently of the others. However, at this time there was a great influx of shrimpers from all other grounds, which brought about greater competition and experimentation with new types of gear. Various refinements, modifications and combinations of flat and balloon trawl principles were soon being tried. During this period the sonic depth recorder became widely used as one of the essential pieces of fishing gear. It is invaluable in preventing loss of gear while investigating new areas and in locating old banks.

In view of the industry's energetic modification and experimentation with the original types of gear, the Fish and Wildlife Service in this area has diverted it's efforts to a program of development of new types of gear. The reversing thermometer is being studied as a means of locating areas suitable for red shrimp (Hymenopenaeus robustus). Results show very definite maximum temperatures above which this species is not taken. More work is planned to better evaluate the extent to which this instrument may be relied upon. The Service believes loran receivers will eventually prove to be as valuable to the fishermen as depth recorders when fishing beyond the sight of land.

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 ABSTRACTER: Keith A. Smith

FISH COOKERY DEMONSTRATIONS SELL FISH

ELECTRIC TUNA FISHING

METHODS OF CAPTURING FLYING FISH

GULF COAST GEAR DEVELOPMENT

2.14 (Cross Reference: 1.9)

Gill nets of 15 and 30-yard lengths with 1-7/8-inch stretched mesh web were tested. The nets were kept small for ease of handling in case sharks and larger pelagic fish were caught. With two 15-yard nets and one 30-yard net the research vessel took up to 9000 flying fish in six to seven hours fishing time, the best single haul being 1005 fish. Since 1951 many of the local fishermen have been using gill nets.

A net of the purse seine type was next tested. This net was 50 yards long and 24 feet deep, made of 1-7/8-inch stretched mesh web. The net is put into the water and allowed to drift to the windward of the boat. The far end is then hauled back by a side line, forming a horseshoe-shaped enclosure. The purse line is then pulled in, trapping the fish. About half of the fish are gilled but the others are caught as in a purse seine. Four hauls using this net caught 6000 fish.

2.1120

Tests have been made aboard the OREGON in cooperation with a private company on that company's new electric snapper reels. Tests show that with these reels anyone can catch snapper as well as experienced fishermen. Results were so poor on snapper trap experimentation that the project was discontinued.

It has been decided to conduct trawl experiments to try to develop special trawls that will operate on bottoms with various obstructions. Areas of coral and shell bottom off Yucatan, of soft mud in newly discovered shrimp beds, of mud lump areas off the Mississippi River Delta and of loggerhead sponges off the Florida coast are believed to contain commercial quantities of shrimp that might be exploited with special types of gear.

2.8

Limited funds and personnel have made it impossible to carry out an extensive program of fish cookery demonstrations for school lunch personnel in many states. Some have no demonstration program at all.

In all demonstrations, every effort is made to use fishery products that are locally produced. However, the importance of demonstrating economical fishery products to school lunchroom personnel often dictates the use of fish coming from more distant areas. Included in the varieties of fish that have been used are ocean perch (rosefish), Pacific rockfish, catfish, cod, haddock, tuna, sardines, salmon, flaked cod and haddock, whiting, pollock, and sea bass. In every Service demonstration at least four varieties of fish are prepared in different ways. After the fish are cooked, each individual in the group is given the opportunity of tasting every recipe prepared. Thus, the idea of showing them, and then giving them samples, is carried out.

2.14 (Cross Reference: 1.1)

least four men on a boat and still only one fish could be hauled on board at a time. Price of this equipment is said to be low.

3.234 THE THERMAL CONDUCTIVITY OF FROZEN FOODSTUFFS

Smith, J. G.; Ede, A. J.; and Gane, R. (Low Temperature Station for Research in Biochemistry and Biophysics, University of Cambridge)
Modern Refrigeration 55, No. 653, 254-257 (August, 1952)

Direct determinations of the thermal conductivity of foods were made with the object of obtaining data on peas, runner beans, broccoli, carrots, potatoes, strawberries, gooseberries, blackcurrants, plums, herrings, cod fillets, whalemeat and whole egg.

A steady-state, guard ring method was used. The material under investigation was placed in a rectangular open-topped cell having two vertical stainless steel faces, each about 10 inches square, Figure 1, this card, over. The temperature gradient across the food was measured by four copper-constantan (32 swg.) thermocouples fixed in grooves on the outside of the steel face with their junctions at the corners of a 2-inch square concentric with the face.

The cold, steel face was cooled by contact with a container of refrigerated kerosene that was continually recirculated. The opposite, or hot face, was heated by being in contact with an electric mat made from 36 swg. nichrome wire wound in continuous guard ring fashion, the area of the inner square being 111.65 cm^2. The generation of heat in the central portion of the mat was evaluated by measuring the current through the wire and the potential across that part of the coil surrounded by the guard ring.

Food to be tested for thermal conductivity was prepared in the customary commercial manner and packed into the cell. The density of the packed mass was then determined by weighing. After the cell had been filled and properly insulated, circulation of the kerosene was established and the food was permitted to freeze completely. At this point the heating current was turned on and adjusted to give a suitable temperature gradient. In some instances several days were required for conditions to become steady. Temperatures were then increased and conductivity calculated in the usual manner. The data that were obtained with herring, cod fillets, whalemeat, and whole egg are shown in the table, this card, over.

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 1 PAGE 3
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Martin Heerdt

3.249 METHODS OF HERRING PRESERVATION

Anonymous
Food Manufacture 27, No. 9, 368 (September, 1952)

Successful preservation of fresh herring requires both the prevention of changes in the texture of the flesh and the prevention of rancidity development in the fat. Rancidity development can be prevented by dipping the frozen fish in water or by spraying them with water to form a thin ice glaze on the surface of the fish. Glazing must be followed by storage at -4° to -22°F. Fish processed in this manner will remain in good condition for from 3 to 6 months, depending upon the storage temperature. Changes in the texture of the flesh can best be avoided by quick freezing prior to glazing and storage at similar low temperatures.

Special Report No. 55 of the Department of Scientific and Industrial Research (Great Britain) entitled, "The Freezing and Cold Storage of Herrings", by A. Banks, describes a number of commercial scale experiments with herring. These trials were based on 137 tons of fish that were quick frozen and stored at either 0°F. or -17°F. Actually, both an experimental air blast freezer and a multiplate freezer were used in preparing the fish. Regardless of the method of freezing, all of the fish were suitable for use in kippering or for sale as fresh herring for as long as 9 months when stored at -17°F. or 6 months when stored at 0°F.

To maintain a supply of fish for kippering throughout the year, it is suggested that the herring should be frozen immediately upon landing, held in cold storage, and kippered as needed. This method produces the best quality of kippers and usually makes year around operation possible. As an alternative, however, the herring may be kippered on landing

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 1 PAGE 3
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Martin Heerdt

3.30 FISH GIVEN "MEATY FLAVOR" BY NEW HYDROGENATING PROCESS

Anonymous
Canner 115, No. 15, 28 (October 11, 1952)

A way to impart a meaty flavor to fish has been found by Alan Osbourne of Cabin John, Md., who claims that the natural oils and juices which give some kinds of fish an unpleasant "fishy" flavor can be converted into desirable tasting materials and returned to the fish.

By Mr. Osbourne's process, the raw fish are first cooked to free unstable oils and taste-imparting juices. Actual separation of the juices and oils from the fish is accomplished by extraction, pressing or centrifuging. Then the juices and oils are separated from each other.

The oil is hydrogenated in order to saturate the fat. The juices containing gelatinous materials may be discarded, or purified and returned to the fish.

A meaty-tasting component such as proteinaceous extract of soybean or sodium glutamate is blended with the hydrogenated oil, along with seasonings and vitamins. The treated oil is returned in a fluid state to the fish, which may then be sealed in cans, metal tubes, or other containers.

COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 1 PAGE 3
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. Reprinted in whole

1.1 MID-OCEAN CHALLENGE

Anonymous
Pacific Fisherman 50, No. 11, 15-16 (October, 1952)

The discovery of a large untapped population of tuna in the Equatorial waters of the mid-Pacific has offered a new challenge to the American fishing industry. The U. S. Fish and Wildlife Service investigators have indicated the presence of a population of tuna apparently far greater than any yet known. The zone of high abundance is reported to extend in a continuous 300-400-mile broad band for almost 4000 miles. Average catches of Yellowfin in the region of 140°, 150°, and 160° west longitude were said to be "three times as great as postwar catches of the Japanese longline fishery in the western Pacific".

How to capture this new-found resource is a problem challenging the American fishing industry. Bait for clippers fishing the live-bait method does not seem to exist in the quantities required for extended tuna clipper operations. Another handicap in tapping this mid-ocean resource is the fact that the tunas of the Equatorial band do not in general appear in the surface waters; consequently, these stocks may not be fishable by the live-bait method.

Both gillnetting and purse seining have proved to be unsatisfactory as methods of harvesting the mid-ocean tunas. Long-line fishing has shown the best promise for commercial exploitation of these tunas.

The challenge to the American fishing industry is a double one: (1) The challenge of an enormous untouched resource beneath the surface of the mid-Pacific. (2) The challenge to improve upon and mechanize the fishing methods of their competitors so that

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 1 PAGE 3
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Dayton L. Alverson

THERMAL CONDUCTIVITY OF FROZEN FOODS

"MEATY FLAVORED" FISH

FREEZING PRESERVATION OF HERRING

MID-OCEAN TUNA RESOURCE

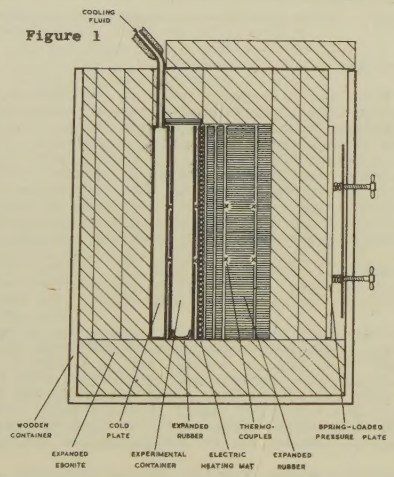
1.1 (Cross References: 2.12, 1.0112)

American fishermen may successfully compete with the fishermen of other countries who will undoubtedly be fishing these waters.

To meet these challenges it may necessitate the design of vessels new to the American fishing fleets. It may involve the construction of gear suitable for fully mechanized operations and it may force the employment of freezerships. New baits and lures are also a possibility. The use of new developments in the field of physics, such as control of fish movements by electronic or sonic means, may also help to solve the problem of capturing the fish.

3.234

Figure 1



Apparatus for Determining Thermal Conductivity

Thermal Conductivity of Frozen Foodstuffs

Description, preparation and packing	Temperature of "hot face"	Temperature of "cold face"	Packing density g./cm³	Thermal conductivity cal./cm. sec./° C.
Fish				
Herrings: Gutted, whole, packed as closely as possible.	−16·6	−21·4	0·91	0·0019
Cod Fillets: Packed as tightly as possible.	−17·4	−21·6	1·0	0·0028
Meat				
Whatemeat: Fat content ~ 0·51%. Pre-frozen as slab.	−10·4	−13·8	1·0	0·00306
Eggs				
Whole Egg: Thawed from tin; refrozen as slab.	− 6·2	−10·0	0·98	0·0023
Whole egg concentrated by 2 (called Dublegg) prepared as above.	− 6·2	−10·4	1·0	0·0013

Conversion Factors

1 cal./cm. sec. ° C. = 4·18 watt/cm. ° C.
= 242 B.t.u./ft.² h ° F.
= 2,900 B.t.u. in./ft.² h ° F.

3.249 (Cross Reference: 3.4)

and then placed in storage until the market indicates a demand for the product. Kippers will remain in good condition for about 3 months at -4°F. or 5 months at -22°F.

2.02 PHYSIOLOGY AND BIOCHEMISTRY OF MUSCLE

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 14-15 (1952)

Oxygen has a pronounced effect on rigor mortis, even in white muscles such as the psoas of the rabbit, provided the strips of muscle used are sufficiently thin to permit adequate oxygen diffusion. When muscle strips 2 to 3 mm. thick were placed in oxygen, rigor could be delayed for 24 to 30 hours post-mortem, whereas in nitrogen a delay of only 10 hours was obtained. The pH of the muscle did not fall below 7.10 in oxygen as compared with 5.7 - 6.00 in nitrogen, and very little of the glycogen reserve was expended. Similarly, the adenosinetriphosphate (ATP) level was still high after 24 hours in oxygen, whereas in nitrogen the ATP was entirely depleted after 14 hours.

In studies with somewhat thicker muscles, the rate of ATP and creatine phosphate breakdown in oxygen and air was found to be inversely proportional to the myoglobin content of the muscle. In oxygen, however, the rate of breakdown was relatively slow, even in white muscles of negligible myoglobin content, whereas in air the rate of ATP and creatine phosphate breakdown was rapid and almost identical with that in nitrogen. The great importance of myoglobin in the living animal under conditions of low-oxygen tension in the blood, such as are found during vigorous exercise, is explained in part by the preceeding findings.

In further studies on the biochemical processes underlying muscular contraction and rigor mortis, decreases in gel volume that had been observed in fresh muscle brei in the presence of 0.16 M. potassium chloride were found to be reversible under certain conditions by the addition of ATP. This reversal to the original volume by addition of ATP at pH

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2.00 STUDIES ON BLACK SPOTTED SHRIMP

Fieger, E. A. (Louisiana State University, Baton Rouge, Louisiana)
Proceedings of the Gulf and Caribbean Fisheries Institute, Fourth Annual Session, pp. 79-82 (April, 1952)

It is now apparent that black spot is not peculiar to Louisiana-caught shrimp. Idyll (1951) described this condition in shrimp taken off the Florida Keys as black discoloration. L'Ecluse, in a communication to the author, drew attention to the seriousness of this disorder in shrimp taken from the Gulf of California and transported by truck to Los Angeles. Empey, Officer of the Division of Food Preservation and Transport in Australia, likewise in a personal communication, reported on a condition known as "black head" in incompletely cooked prawns (shrimp). In similar manner, Chambionnat of the Official Chemical Laboratory of Morocco has studied a development known as the black discoloration of the pink shrimp of Morocco, Parapenaeus membraneus, Risso or Parapenaeus longirostrus, Lucas. The foregoing reports indicate that the black discoloration of shrimp is world-wide in its distribution and a more serious problem in Morocco and Australia than elsewhere.

Black spot development in shrimp, either whole or headless, occurs during refrigerated storage. In headless shrimp, one or several black spots or bands usually appear on the abdomen or "tail" at the base of the shell segments or across the back of the tail where the shell segments overlap. In whole shrimp black spot usually develops first in the head cavity and results in the carapace or "head shell" becoming black. In 75 percent of the black spotted shrimp examined, the chitin or shell had been punctured or eroded away as a result of chemical solution. Black spot or black discoloration is caused by an enzyme system that is present in the shrimp tissue. This finding was first demonstrated

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2.12 EXPLORATORY FISHING FOR THE LITTLE TUNA (EUTHYNNUS ALLETTERATUS) OFF THE ATLANTIC COAST OF THE UNITED STATES

Carlson, C. B. (Fishery Engineer, U. S. Fish and Wildlife Service, College Park, Maryland)
Proceedings of the Gulf and Caribbean Fisheries Institute, Fourth Annual Session, pp. 89-94 (April, 1952)

Recently the U. S. Fish and Wildlife Service and the Blue Channel Corporation working independently developed a slow-cooking process for canning little tuna (Euthynnus alletteratus) that gave a pleasing light colored pack. Thus a year-round supply of little tuna became desirable to provide raw material for the industry in the "off seasons" of the other fisheries.

In February 1951, the M. V. Barbet spent two weeks exploring for little tuna from Savannah, Georgia to Cape Canaveral, Florida at distances from 5 to 150 miles offshore. No surface schools were found during this exploration and only 5 little tuna were caught on trolling lines.

A search of the literature and a survey of the fishermen indicated that the species moved northward along the South Atlantic and Gulf coasts in the spring and summer months and back southward during the fall and winter. The schools vary greatly in size and are generally found only in calm weather.

An agreement was made in June 1951 whereby the Fish and Wildlife Service furnished fishing gear, technical supervision, and part of the operating costs for another exploration, while the Blue Channel Corporation furnished a vessel, crew and the balance of the operating expenses. Approximately two months were spent between Cape Hatteras and Fort Pierce searching for surface schools. The best fishing was found between Cape Canaveral and Fernandina, Florida ten to fifteen miles offshore in ten to fifteen fathoms of water. Fish were caught on trolling lines in this area and some small schools were found. Schools were never seen where the height of the sea was more than three feet.

The period from June 26 to July 13 was spent in areas between Port Royal Sound, South Carolina and Cape Hatteras, North Carolina. Scattered fish were taken by trolling in ten to

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2.00 MILKY HAKE

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 23 (1952)

A large proportion of the Mauretanean hake landed at ports along the coast of Wales during the early part of 1950 exhibited an unusual degree of softness of tissue or "milkiness". This condition not only made the flesh unsuitable for sale as food, but in extreme cases gave the flesh the appearance and texture of a thick, milky-white paste as if the muscle of the fish had been broken down by digestion.

Except for softness of the muscle tissue these hake failed to show any real difference in quality between the firm and the soft specimens of the same age. Bacteriological examination likewise failed to show any difference in the degree of spoilage between the firm and the soft-fleshed specimens. Microscopic examination of the digested muscle tissue, however, did show the presence of numerous yeast-like bodies arranged in rosettes. These rosette clusters are believed to be spores of the parasitic protozoan, Chloromyxum thyrsites. According to the literature, this parasitic protozoan is the cause of a similar condition in South African fish such as the stockfish, Merlucius capensis; John Dory, Lens capensis; and snoek, Thyrsites atun.

Australian studies indicate that the protozoan, Chloromyxum thyrsites secretes a strong proteolytic enzyme. This enzyme is subject to immediate removal by the circulatory system as long as the parasitized fish is alive. However, the enzyme acts destructively in the muscle where it is formed when the fish dies.

2.12 (Cross Reference: 1.1)

fifteen fathoms of water here also but no schools large enough for purse seining were found. The period from July 17 through August 3 was spent working southward from Port Royal Sound to Cape Canaveral. Many schools, varying from a few fish to extensive tonnage, were found in this area. These schools were all seen in relatively calm weather.

Explorations were resumed on August 27 with a converted aircraft rescue boat, 104 feet long, fitted for purse seining. Due to mechanical difficulties and bad weather, very little time was actually spent operating the seine. However, on August 29 many schools of little tuna were seen off St. John's Lighthouse. One set was made but the school was missed. Between Cape Lookout and New River, small schools were seen nearly every day. Three sets were made catching 0, 30, and 40 fish, respectively. It was believed substantial catches could have been made had the purse seine boat been available earlier in the summer during the good weather.

Some biological observations were made during the trolling part of the trip. Stomach contents found are listed in Table 1. Size distribution is shown in Table 2.

Table 1

Species	No. of Item Identified
Round herring--Etrumeus teres	46
Squid	33
Spanish sardine--Sardinella anchovia	14
Unidentified fish	13
Round scad--Decapterus punctatus	9
Spanish mackerel--Scomberomorus maculatus	1
Mud parrotfish--Sparisoma flavescens	1

Table 2

Size Range Inches	Percentage
15.4 to 19.9	15
20.0 to 24.9	68
24.9 to 32	17

2.02 (Cross Reference: 0.36)

values of about 7 is followed by another decrease in gel-volume as the added ATP is broken down by the brei. The process can be repeated by further addition of ATP and has been observed in muscle 12 hours after the establishment of rigor. However, if the brei is first washed with KCl solution, decanted, and replaced by fresh KCl, the addition of ATP will produce an irreversible gel-volume decrease. The resulting gel-volume decrease is very similar to those obtained by Szent-Gyorgyi with glycerol-treated muscle-fiber bundles. The presence of some KCl-soluble factor responsible for the reversal of the gel-volume decrease by the addition of ATP is therefore indicated. From appearances, the factor is heat-labile and may be a protein.

Addition of ATP to a muscle fiber suspension in which the first volume decrease has been allowed to occur, results in a microscopically visible lengthening of the fiber by as much as 70 percent followed by a shortening to approximately the original length. In the absence of this factor, only shortening of the fiber occurs (to about 40 percent of its length). This latter change closely resembles decreases in fiber length observed during thaw-rigor of muscle that has been rapidly frozen in the pre-rigor condition.

2.00 (Cross Reference: 1.85)

by J. A. Alford and the author in September, 1950. At about the same time, the Morocco group under the leadership of Chambionnat came to the same conclusion.

The author has shown by a number of varied experiments that air, or more specifically, oxygen, is necessary for the development of black spot. These findings suggested that an oxidative enzyme was involved. When whole or headless shrimp were suspended in solutions containing dihydroxyphenylalanine, and air was bubbled through the solutions while the containers were packed in ice, the liquid turned black within six hours. All shrimp that had been in the solution likewise were possessed of well developed black spots. Since both mono- and dihydroxyphenyl derivatives are oxidized by shrimp tissue and shrimp extracts, the author has tentatively designated the enzyme as tyrosinase. The action of this enzyme in the presence of air causes the oxidation of tissue substances in shrimp and the formation of melanin with its characteristic black color.

This enzyme is present in the head, fins, legs, and the shell and membrane of the tail of shrimp but not in the tissue of the tail. Now that the black substance formed in the shrimp through the action of tyrosinase is almost certain to be melanin, the term melanotic shrimp has been suggested in place of black spot. The chemical changes that occur would then be known as melanogenesis and the black coloration as melanosis.

4.61 THE DEVELOPMENT OF RANCIDITY IN COLD-STORED HERRINGS: THE INFLUENCE OF SOME ANTIOXIDANTS

Banks, A. (Department of Scientific and Industrial Research, Torry Research Station, Aberdeen, Scotland)
Journal of the Science of Food and Agriculture 3, No. 6, 250-256 (June, 1952)

Four different lots of whole herring caught off the north-east coast of Scotland were used to test the effect of ascorbic acid, gallic acid, ethyl gallate and pyrocatechol as antioxidants. Each lot was composed of four separate and distinct control samples and four samples containing antioxidants. Each sample was further subdivided into units for use in subsequent tests. Each unit consisted of a 7-pound block of herring that had been frozen in a tapered metal container measuring 14 x 9 x 2 1/4 inches, in a blast of air at -30°F.

The control samples received 25 ounces of tap-water prior to freezing as an addition to the 7-pound unit quantity of herring, and an ice glaze upon removal from the metal container. The samples containing antioxidants were prepared by adding 25 ounces of water containing 0.37 ounces of antioxidant to each 7-pound unit quantity of herring, so that an antioxidant concentration of 0.3 percent was provided. The antioxidant-containing samples did not receive an ice glaze upon removal from the metal containers. All frozen blocks of herring were stored unwrapped in wooden boxes at -20°F.

At intervals, one block without and one block with the antioxidant was removed from storage and allowed to thaw overnight. Two lots of four fish were selected from each block and the surface layers to a depth of 1-2 mm. were removed. Fat was extracted from the surface material with petroleum ether after first drying with anhydrous sodium sulfate. Peroxides were determined by the method of Banks, 1937. In addition, two herring from each block were steamed in a casserole for 30 minutes and then examined organoleptically under code by experienced tasters.

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 ABSTRACTER: Martin Heerdt

4.7 THE FISH OIL SITUATION

Coburn, John F. (Archer-Daniels-Midland Company)
Fish Meal and Oil Industry 4, No. 8, 8-10 (August, 1952)

Fish oils, particularly sardine and menhaden oils, are among the most universally useful fats in commercial production. They can be used in manufacturing all sorts of industrial products including soap, lubricating greases, leather oils, textile oils, floor coverings, printing inks and protective coatings of all kinds. Although fish oils are useful in making these products, in almost every instance they are a marginal substitute for some other fat or oil that is better adapted to the purpose. Consequently, fish oils have traditionally been thought of in terms of so much under the price of some other commodity.

In the early days much of the fish oil produced was made into soap. The soap manufacturer would buy fish oil for approximately one cent per pound under the price of tallow to extend his supply of these animal fats. Gradually as more and more was known about the technical uses for fish oils, larger and larger percentages of the production went to drying oils and into industrial chemicals such as metallic soaps. For the past several years almost no fish oil has been used in making laundry or hand soaps.

When fish oil was decontrolled from OPA ceilings in 1946 it was priced at 8.9 cents per pound. After the ceilings were lifted the price shot up. Gradually, as the pent-up demand became satisfied, the price dropped. Just before the Korean episode it was selling for 5-6 cents per pound, approximately its present level. The Korean war again stimulated buying and the price shot up to 18 cents until OPS established a legal ceiling of 16 cents. Immediately after ceilings were established, prices again started downward until they

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 ABSTRACTER: Kathryn L. Osterhaug

3.4 THE CHEMISTRY OF WOOD SMOKE

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 28 (1952)

Improved techniques are needed for the chromatographic separation of the alkyl-substituted phenols likely to arise from the lignin portions of the hard woods used in smoking. Thus far, attempts to separate partially methylated phenols have proved unsuccessful; however, model experiments have demonstrated the possibility of identifying and estimating the parent phenols by micro-demethylation and chromatographic analysis.

Evidence exists to show that the bacteria remaining on the surface of the fish after smoking are capable of utilizing and reducing the wood smoke phenol content to the point that protection against surface spoilage is lost. It is definitely possible to examine the activities of these phenol-utilizing microorganisms and the changes that they effect on the smoked surface of the fish. Attention has been directed, therefore, to the micro-estimation of the individual components of a complex mixture of phenols as an initial step in the study. By using the chromatographic techniques indicated above and eluting the paper strips under controlled conditions, phenols in quantities as small as 8 micrograms have been assayed with an accuracy of ± 5 percent.

 ABSTRACTER: Martin Heerdt

4.21 OXIDATION OF UNSATURATED FAT AND FATTY ACIDS

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 27 (1952)

Presumably cytochrome c. should possess no catalytic effect; yet, early investigations showed that this substance does catalyze oxidation. However, if pure substrates are used, cytochrome c. will actually show antioxygenic properties. The reaction between peroxidized linoleic acid and cytochrome leads to the breakdown of both substances. Apparently, cytochrome catalyzes the decomposition of linoleic acid peroxide in some manner. This reaction, according to the tests made, may be of a "catalase" type in which the cytochrome catalyzes the decomposition of peroxides to produce gaseous oxygen. While the production of gaseous oxygen explains the antioxygenic action of cytochrome, attempts to confirm the preliminary experiments have not succeeded. The reason for the failure probably is due to the presence of an excess of unattacked linoleic acid in the system. Under the conditions of the experiment the latter acid will readily absorb any gas that is evolved as a result of the "catalase" effect.

Efforts are now being made to prepare concentrates of linoleic acid peroxide in spite of unfavorable literature references, and an unpublished technique has been found for the separation of methyl oleate peroxide from oxidized methyl oleate. Surprisingly, the separation technique works exceedingly well with linoleic acid and apparently provides a simpler way of concentrating linoleic acid peroxide than the published methods for isolating methyl oleate peroxide. An effort will be made to prepare pure linoleic acid peroxide.

 ABSTRACTER: Martin Heerdt

ANTIOXIDANTS FOR COLD-STORED HERRING

CHEMISTRY OF WOOD SMOKE

FISH OIL MARKET SITUATION

OXIDATION OF UNSATURATED FATS

4.21 (Cross Reference: 0.35)

4.61

Figures 1 to 4, omitted, show that the four antioxidants had a positive effect on the frozen herring in lots 1 and 2 but little effect on lots 3 and 4. In short, the controls reached a peroxide value of 5 within 16 and 18 weeks, respectively, in lots 1 and 2; whereas, the samples containing ascorbic acid, gallic acid and ethyl gallate reached the same value after about 30 weeks of storage. Figure 3, omitted, shows first, that the untreated herring in lot 3 had a storage life of 28 weeks as compared with 16 to 18 weeks in the case of lots 1 and 2. Figure 3 shows, in addition, that ethyl gallate and ascorbic acid had no effect on the herring in lot 3, whereas, gallic acid and pyrocatechol extended the storage life to about 34 weeks. Figure 4, omitted, indicates that the controls of lot 4 also required 28 weeks to reach a peroxide value of 5. In this instance, gallic acid had no effect, ethyl gallate and pyrocatechol extended the storage life to about 50 weeks and ascorbic acid occupied an intermediate place. In summary, pyrocatechol, the reference antioxidant, appeared to be the most powerful; the others were inconsistent.

Organoleptically, the control herring in lots 1, 2, 3, and 4 approached inedibility after 25 to 28 weeks of storage. In the antioxidant-treated samples, ethyl gallate appeared to be the most effective organoleptically, although in one lot it failed to prevent inedibility after 35 to 39 weeks of storage. Ascorbic acid was perhaps the least effective; however, the samples treated with ascorbic acid and gallic acid developed unpalatable flavors at about the same time as the untreated controls.

The effect of ascorbic acid and ethyl gallate on herring fillets that had been soaked for 5 minutes in a 1 percent antioxidant solution, frozen in a block in air at -30°F., well-wrapped in parchment, and stored at -20°F. was also determined. From the standpoint of peroxide values, ascorbic acid almost doubled the storage life of the fillets; ethyl gallate had a lesser effect. Organoleptically, the filleted herring approached rancidity after 16 weeks of storage, and neither ascorbic acid nor ethyl gallate had any effect in retarding the development of rancidity. In addition, the reated samples all tasted strongly of antioxidant and were considered inferior to the controls.

4.7 (Cross Reference: 4.8)

reached current levels.

During the first rise after World War II fish oil prices were proportional to the rise in price of soybean oil. Europe at that time was desperately short of fat and would buy almost anything they could lay their hands on. Fish oils in Europe are manufactured into edible products in the same manner as soybean and cottonseed oils are used in this country.

For the first time since 1941, production of fats and oils for the world as a whole reached a level in 1951 such that per capita supplies were about equal to their pre World War II level. Much of this increase in production has taken place in the United States largely through soybean oil production.

In addition to the substantial increases in United States production of fats and oils, Europe has increased her supply of peanut, fish, and whale oils. Italy, which experienced a disastrous failure of her olive oil crop in 1950, is again back to full production. Consequently, much of the demand from Europe for fats from this country has disappeared. A good deal of the demand for soybean oil was replaced by coconut oil which for some time was priced below fish oil delivered to European ports.

It appears that prices for fats and oils are at or near their bottom.

Fish oils now have more technical uses than ever before, and variation in quality is an extremely important factor to the buyer in relation to purchase price. Animal fats and fish oils are the only two that do not have a uniform trading rule established. Since trading rules have been established for soybean oil it has been found to work to the mutual benefit of the producer and the buyer as well as for the industry as a whole.

3.5 VENEZUELA ESTABLISHES NEW SCHOOL FOR FISH SALTING

Anonymous
Foreign Commerce Weekly 48, No. 15, 18 (October 13, 1952)

The Venezuelan Ministry of Agriculture has established a school housed on a launch that will visit coastal and river points to acquaint fishermen with modern methods of salting fish.

The head of this new service was trained in marine biology in the United States. The Chief of the Bureau of Agricultural Economics, which administers the fisheries, states that heretofore 80 percent of the fish catch in Venezuela has arrived at the market in poor condition.

The new system stresses the use of clean water, refined salt, and a press. Presses are for sale by the Ministry of Agriculture, and if fishermen lack funds to purchase them, arrangements have been made with the Banco Agricola y Pecuario to advance credit.

The question is being studied of limiting the marketing of salt fish to the bacalao type from those places where the school has taught the new system, thus giving the plan a measure of compulsory education.

Production of salt fish in 1951 was 9,875 metric tons, and for the first 6 months of 1952 it was 8,782 tons.

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3.5 MOISTURE CURVES FOR LIGHT-SALTED COD

Dingle, J. R. (Atlantic Fisheries Experimental Station, Halifax, N. S.)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 53, 8-9 (April, 1952)

The equilibrium moisture curve for Newfoundland light-salted cod was determined at 50°F. and 68°F. as a means of predicting the amount of drying that would occur in the product when placed in rooms of any given relative humidity.

For the study, 16 pounds of Inagua salt was applied principally to the fleshy part but also to the napes and tails of a 100-pound quantity of split cod. After 96 hours of kenching at 60°F. the split fish were washed and press-piled for an additional 65 hours and then placed in an experimental drier for 36 hours at 80°F. and 20 to 60 percent relative humidty. The final moisture and salt content of this lot of fish on a wet basis was 49.3 percent and 13.8 percent, respectively. Recalculated to a 36 percent moisture content, this fish would contain 17.5 percent salt.

By suspending 2-gram samples of the salt fish in a number of stoppered flasks containing saturated solutions of various substances and removing and weighing the samples from time to time, it was possible to determine the rate of drying under static conditions. Saturated solutions have the property of maintaining a known relative humidity when kept in stoppered flasks. Eventually, the samples arrived at a constant moisture content as a result of storage in the saturated air in the two series of flasks at 50°F. and 68°F., respectively. The weights obtained at this stage were used to plot equilibrium moisture curves, Figure 1, this card, over. The plotted data indicate that temperature has no effect upon the equilibrium moisture content of light-salted cod.

The data presented in Figure 1, refer to equilibrium moisture conditions and are of no value in predicting the effect of the relative humidity on the rate of drying. The method used to gather the data, however, did make it possible to compare the rate of drying

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 ABSTRACTER: Martin Heerdt

3.24 COLD STORED WHITEFISH, HERRINGS, AND KIPPERS

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 24-25 (1952)

Only a relatively small amount of quantitative data are available on the deterioration of whitefish during cold storage. To obtain more information, experiments have been started with the object of defining in detail the changes that occur in cold-stored haddock and cod. Particular attention will be given to the effect of storage in ice prior to freezing. For the present, work is being carried out on the estimation and analysis of the "drip" produced from fresh fish when subjected to pressure. The denaturation of protein and the suitability for smoke curing also are being investigated as criteria of frozen quality.

Studies on the effectiveness of antioxidants in delaying the onset of rancidity in frozen herring have reached completion. None of the substances tried, i.e. ascorbic acid, gallic acid, and ethyl gallate, were of particular value as antioxidants for frozen herring during the 8- to 11-month storage period. This confirms the tentative conclusions drawn at the end of a 4-month storage period.

Most of the findings to date have indicated that freezing fresh herring, thawing and then kippering yields a product of better quality than kippering prior to freezing. However, the question of when to kipper has again reached a state of controversy and the subject has been reopened.

Further studies on the comparative keeping quality of fresh frozen and kippered herring are now in progress. Initial curing of the kippers has been controlled by the staff of the Torry Research Station to eliminate variation in the extent of drying during

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 ABSTRACTER: Martin Heerdt

3.231 FREEZING AT SEA

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 24 (1952)

A small pilot plant has been designed and constructed for use by the Torry Research Station in freezing fish on board the M. F. V. Keelby. The equipment installed consists of movable, vertical, refrigerated plates between which the dressed fish are placed and frozen in the form of large slabs. The movable plate system overcomes the difficulties encountered in the use of ice-cans as molds for freezing and reduces the strain of freezing expansion that occurs when the fish are frozen between fixed plates. Movable plates also permit the ejection of the frozen blocks without difficulty.

While water could be added with ease to the ice-can freezer as a means of improving the rate of heat transfer, subsequent tests have shown no clear advantage to adding water because of the increased refrigeration load. Ice-molds, therefore, would have utility only where other advantages are indicated. Experience shows that hydraulic or pneumatic jacks are necessary for the removal of the blocks of fish when they are frozen in ice-cans.

A single-station, movable-plate, freezer unit has also been constructed for use in the laboratory at the Torry Research Station. Both the rate of flow of the refrigerant in the plates and the relationship of freezing time to the thickness of the block will be studied. Various modifications of the method of applying refrigeration to the plates will be tried. Herring fillets as well as large headless cod will be frozen experimentally.

The study concerned with the freezing of fish in brine wells in the hold of a trawler while at sea has reached a new stage of development. Part of the model trawler hold at

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 ABSTRACTER: Martin Heerdt

VENEZUELAN FISH-SALTING SCHOOL

FROZEN FISH RESEARCH

MOISTURE CONTROL IN SALTED COD

FREEZING FISH AT SEA

3.24

kippering. The Torry Station staff also will be used to judge the quality of the kippers prepared by the two methods. The preliminary results indicate that the degree of curing is a prominent factor in the quality of kippers held in cold storage.

3.231 (Cross Reference: 2.118)

Torry Station will be insulated to maintain temperatures as low as -29°C. (-20°F.). The inner surface of the low-temperature hold will then receive a brine-tight lining.

3.5 (Cross Reference: 1.013)

3.5 (Cross Reference: 1.5)

with the passing of time. From these data (not given in the original) it appeared that lowering the relative humidity increased the rate of drying. Below 50 percent relative humidity, however, the rate of drying did not continue to increase. As might be expected, an increase in the drying temperature increased the rate of drying, but, as the plotted equilibrium moisture data indicate, it did not affect the final moisture content. Trial runs in a commercial drier are the only safe way of determining actual drying conditions.

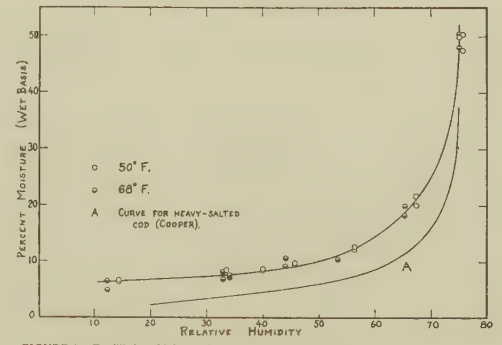

FIGURE 1.—Equilibrium Moisture Curve for Light-Salted Cod.

0.6 ANNUAL REPORT OF THE FISHERIES RESEARCH BOARD OF CANADA, 1951

Reed, G. B. and Dymond, J. R. (Chairman and Vice-Chairman, respectively)
Annual Report of the Fisheries Research Board of Canada, 1951, 185 pages, (March, 1952)

The Annual Report discusses in brief the research work of the various laboratories of the Department of Fisheries. Included in the list of laboratories and units conducting various investigations are:

Atlantic Biological Station
Central Fisheries Research Station
Newfoundland Fisheries Research Station
Pacific Biological Station
Fish (Salmon) Management
Joint Committee on Oceanography
Arctic Investigations
Atlantic Fisheries Experimental Station
Station Experimentale de Peche da la Gaspesie
Pacific Fisheries Experimental Station

The annual report is concerned with commercial fisheries and technological research as well as biological, oceanographic, and fishery management findings.

0.5 BACTERIOLOGY OF FISH

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 26 (1952)

The flora of the slime from Arctic cod consist of the same families as are found in the slime from North Sea fish. These families, however, do not occur in the same ratios on the fish from the different areas. In Arctic fish, for example, the Pseudomonacae account for approximately 40 percent of the total flora, whereas in North Sea fish this family represents only 10 percent of the total. In contrast, the Micrococci are present to the extent of about 5 percent in Arctic fish and 20 percent in North Sea fish. Sometimes, as in the case of the Achromobacter and Corynebacteria, which are present to the extent of 50 and 10 percent of the population, respectively, the ratios are similar.

More information is needed in regard to the effect of season, species, etc. upon the flora of newly caught fish. Before anything can be accomplished, however, quick and efficient methods of identifying and classifying marine bacteria must be found. The luminous bacteria are one group consisting of about 6 species, in all, that can be identified with ease; consequently, a study of these microorganisms with regard to the numbers and species found on halibut during a given season has been undertaken. Thus far, the results have confirmed those of several years ago in that the luminous bacteria are present in the slime in appreciable numbers only during April to October. The latter finding suggests qualitative variations in the flora of fish.

At monthly intervals during the year 1950, about 150 luminous bacteria, in all, were isolated from haddock and classified. Surprisingly, all belonged to one single species, yet other luminous species are known to occur on fish. This finding suggests that each

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 ABSTRACTER: Martin Heerdt

1.016 FISH PROCESSING IN SOUTH AFRICA. PART III

Empey, W. A. (Division of Food Preservation, Australia)
Fisheries Newsletter 11, No. 8, 8-10, 23 (August, 1952)

Preserving by icing. Fish icing practices in South Africa are similar to those in other parts of the world. Most of the 36 deep sea trawlers are of the older coal-burning types, which during trips of six to eight days throughout the year handle about 25,000 tons of hake (stockfish). This tonnage comprises more than 80 percent of the total annual catch of deep sea trawled fish. About a ton of ice is carried for each 1 1/2 tons of fish. Different species are kept apart and all hake are headed and gutted before stowing.

One trawling firm has arranged regular arrivals of its trawlers at Cape Town on Wednesdays and Sundays each week. The fish are unloaded in wicker baskets, placed on an inclined conveyor and taken onto the wharf where they are prepared for sale the following morning. Fish to be transported to Johannesburg are packed into large boxes with ice and placed in well-insulated rail vans holding about 14 tons of fish. No ice is used in the bunkers of these rail vans during the 36-hour journey.

Preserving by freezing. Only a relatively small percentage of fresh fish is preserved by freezing, but large quantities of smoked fish and crayfish-tails for export are frozen. The fish is usually sharp-frozen in rooms or on shelf coils at air temperatures of about -15°F. Storage temperatures of 0°F. to -5°F. are commonly used.

The possibility of developing quick freezing of white fish fillets is being explored by one firm which has installed equipment capable of freezing one-inch-thick blocks of fillets in about 90 minutes.

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 ABSTRACTER: Kathryn L. Osterhaug

0.4 FISH POISONING CONTROL BY DISINFECTION

Anonymous
Pacific Fisherman 50, No. 11, 69 (October, 1952)

A practical method for control of the bacteria causing "fish poisoning", or the "erysipeloid" disease, common in fish-packing plants and on fishing boats has been reported.

Three types or degrees of the poisoning are recognized: 1--mild, local infection of the surface of the area where the bacteria were introduced by cut or abrasion; 2--diffuse, generalized dermatitis over much or all of the body; 3--blood-stream type in which the infection enters the circulatory system, often with fatal results. In order to successfully treat even the mild form, the infected members must be immobilized. Fish poisoning is therefore a major cause of lost time among fishermen and shore plant workers.

Control methods developed by a Chicago laboratory have been proved effective. However, it is cautioned that control is not a single treatment proposition but must be continued, as new organisms are introduced with fish slime. The laboratory's control recommendation is as follows:

"In the presence of organic material such as fish slime and blood, effectiveness of all germicides is greatly reduced. The surfaces must be thoroughly cleaned with Divoluxe, used at a concentration of from 1/3 to 1 oz. per gal., depending upon the amount of contamination. Once cleaned, the areas and objects may be flushed with Diversol solution at 250 ppm. (1 oz./gal.), using a contact time of 5 minutes, with the assurance that the

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 ABSTRACTER: Roy C. Stevens

1.016

Smoke curing. The annual production of smoked fish in South Africa is between 7,000 and 8,000 tons, consisting principally of hake and of smaller quantities of maasbanker, snoek, and miscellaneous species. Most of the products are processed by cold-smoking although some snoek, eel and maasbanker are hot-smoked.

Smoked fish to be held for longer than a week, and all those for export are packed into shallow 14-lb. boxes and frozen in staggered stack formation in rooms at -10°F. to -15°F.

Processing crawfish. The annual production of processed crawfish tails (Jasus lalandii) is in the vicinity of 4,000 tons, representing approximately 16,000 tons of whole crawfish. This quantity is almost equally divided between frozen and canned products.

The crawfish are alive when brought to the factory, where they are washed by hosing with sea water and their tails are removed. The tails are placed in running sea water for a short time, removed by forking and drained. Skilled women pickers remove the intestinal tracts from the tails at the rate of 900 or more per hour. The prepared tails are then graded and wrapped individually in loose cellophane with an inside paper descriptive label. Twenty-one pounds of tails are packed into 20-lb. boxes to allow for 5% loss of weight during freezing and storage.

Freezing is carried out on shelf coils spaced about 9-inches apart in a room held at about -20°F. The boxes are removed after 36 hours to a storage room held at -12°F.

Most of the canned crawfish produced in South Africa consists of tail flesh packed in 8-oz. cans using canning methods similar to those used in other parts of the world.

Other products. Other products processed in South Africa include agar, salt fish, vitamin preparations from fish livers, and pearl essence from pilchard scales.

0.4

erysipeloid organism will be destroyed. During processing, hosing of the work area should be accomplished at regular intervals, and cutting knives immersed in Diversol solution. Disinfection of hands periodically will lessen the chance of erysipeloid infection, should the skin be punctured."

0.6 (Cross Reference: 9.10)

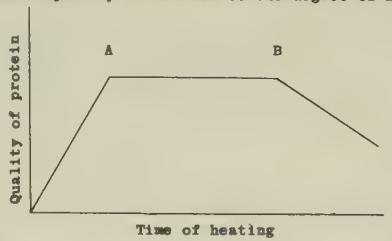
0.5 (Cross Reference: 2.01)

species of fish may be associated predominantly with one single species of luminous microorganism. In addition to the foregoing investigations, the amino-acid utilization of several strains of Achromobacter and Pseudomonas isolated from Arctic cod, is being studied with the aid of chromatographic technics.

6.190 NUTRITION RESEARCH CONFUSION CITED AT ARKANSAS CONFERENCE

Newell, Martin E. (Feedstuffs Editorial Staff)
Feedstuffs 24, No. 40, 8, 10, 74-75 (October 4, 1952)

Dr. James McGinnis of Washington State College presented the following chart to show that soybean oil meal protein quality is related to the degree of heat treatment provided.



Point A represents the quality of a meal that has been exposed to a temperature of 100°C. in an atmosphere of steam for approximately 15 minutes. Between points A and B protein quality remains high; however, if heating continues beyond point B, the protein quality begins to decline. Two tests can be used to determine if solvent-extracted soybean oil meal has been properly heat-treated. Until point A has been reached, the urease that

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 ABSTRACTER: Martin Heerdt

6.130 FISH BY-PRODUCTS

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 25-26 (1952)

The alkali reduction of herring continues to be a subject for study.

The difficulty experienced in separating the mixture of fish and caustic soda solution into layers in the very large storage tanks that were used has indicated the need for a series of smaller storage tanks. The use of smaller containers should not only eliminate the problem of thick sediments consisting mainly of bone, but should also reduce the storage time necessary and thereby lessen the loss of oil as soap. At present, the loss by slow saponification of neutral oil approximates 1 percent of the total oil content per month of storage at summer temperatures when an equal volume of 3 percent alkali solution is added to the fish.

In an attempt to minimize the destructive effect of alkali on the nutritional values of the proteins, less caustic soda, lower digestion temperatures, and greatly reduced periods of holding in the hot alkaline liquor during oil recovery have been tried. Experimentation on a pilot plant scale has proved the possibility of obtaining satisfactory storage for periods of one month when using as little as two-thirds of the normal amount of alkali. One of the most important factors in the digestion of the fish with reduced amounts of alkali is the freshness of the raw material. Surprisingly, stale and spoiled fish is more difficult to dissolve at the minimal alkali concentration.

The laboratory findings on the minimal alkali concentration, temperature, and the holding period have been put into practice on an experimental basis at The Herring Industry

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 ABSTRACTER: Martin Heerdt

6.85 FISH GLUE

Anonymous
Western Fisheries 45, No. 1, 55 (October, 1952)

Fish glue is made by heating salt-free waste in water, and, after it is filtered and evaporated to a specified viscosity, is treated with an essential oil dissolved in ethyl to prevent the growth of mold and to mask the fishy odor of the glue.

Fish glue is marketed in liquid form and is used by photoengravers and bookbinders, by boxmakers and furniture manufacturers, by manufacturers of mucilage, court-plaster, labels, stamps, and as a sizing agent.

Fish glues are superior to animal glues where a true flexible glue is required. That used by photoengravers is made from the fish-run glue liquors from fish skin.

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4.90 HOLDER ANALYZES FISH OIL PROSPECTS

Kennedy, Frank A.
Fish Meal and Oil Industry 4, No. 26, 4, 14 (August, 1952)

Ralph C. Holder, special consultant and technical advisor to the NFI, recently issued a report analyzing the prospects for the fish oil industry in the manufacture of animal feeds and rations. The report was based on the opinions of various research teams at several mid-western colleges and universities. The pertinent sections of his report are outlined as follows:

1. Disadvantages of fish oil as a feed ingredient.

   (a) True or not, the general impression is that poultry utilize fat inefficiently.
   (b) The idea that fish oil flavors poultry meat is generally accepted. Mr. Holder feels that this is not so if high grade oil is fed at practical levels.
   (c) It has been reported that fish oil (cod liver oil) destroys vitamin E.
   (d) Fish oil or any oil fed in excess causes soft pork.
   (e) Fish oil may become rancid if present in feed in excessive amounts.
   (f) Fish oil has been reported to cause leg deformities in turkeys (Scott at Cornell).

The above are objections to the use of fish oil as a feed ingredient which must be recognized as obstacles to be overcome.

Mr. Holder points out:

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 ABSTRACTER: Kathryn L. Osterhaug

NUTRITIVE VALUE OF ANIMAL FEEDS

FISH GLUE

ALAKLI REDUCTION OF HERRING

FISH OIL AS A FEED INGREDIENT

4.90

(1) That most of the objections lack proof. They are theories rather than facts.
(2) In all cases, limited use of fish oil as a feed ingredient would not be objectionable.
(3) Recognizing the above and until direct research on the use of fish fat as a source of energy has been conducted, any promotional campaign should be based upon low levels of fish oil.

2. Advantages of fish oil as a feed ingredient.

(a) Since fish oil has 2 1/4 times the energy value of carbohydrate, it becomes a possible economical feed ingredient when priced at 2 1/4 times carbohydrate cost.
(b) Fish oil will supply to a ration great advantages other than energy value:

(1) Five to ten pounds of fish oil per ton of poultry or hog mash greatly improves feed texture.
(2) Adding this amount of fish oil to feed increases feed intake due to increased palatability.
(3) Addition of five - ten pounds of fish oil improves the color of the feed.
(4) There are two schools of thought on dairy feed. One school (Cornell) advocates 4 1/2 percent fat in a dairy feed. With the growth of solvent processing of oil seeds, it has become very difficult to produce dairy feeds with over 3 percent fat. There is a large group who consider that 3 percent is fully adequate in a dairy feed. For the present, at least, adequate fat can be used to produce 4 1/2 percent fat dairy feeds.

What has been said above regarding the value of fat as a feed ingredient applies to good-quality fish oil. It must be free from strong odors, excessive color, and low in rancidity. This does not mean that it must be a refined oil. It does mean that the fish oil must be produced from fresh fish relatively free from decomposition products.

6.190

is present in raw soybean oil meal will react with urea to produce ammonia. A negative test, therefore, usually is indicative of the minimum amount of heating necessary for urease inactivation or a meal that has reached point A in protein quality. Beyond point B, protein quality begins to decline because, with overheating, some of the essential amino-acids (lysine and methionine) react chemically with some of the sugars in the meal. The products of the latter reaction can be measured somewhat quantitatively by the degree of their fluorescence under ultraviolet light. Neither of these tests can be applied to expeller soybean oil meal. The decline in protein quality that results from overheating is common to cottonseed oil meals, meat meals, and fish meal as well as soybean oil meal.

Dr. McGinnis believes that trichloroethylene-extracted soybean oil meal would not be poisonous to cattle if, in the treatment of the meal direct steam heating is used in place of dry heat at the recommended temperature. Raw soybean oil meal contains a heat labile fraction that will interfere with blood clotting in animals. Inactivation of this factor apparently requires a substantial amount of moist heat.

According to Dr. E. L. R. Stokstad of Lederle Laboratories, enlarged hock in turkeys shows evidence of another nutritional interaction. Enlarged hock is aggravated by the inclusion of 2 to 4 percent of cod liver oil in a diet containing 12.5 milligrams of niacin per pound and can be prevented by the addition of yeast. Depending upon the degree of rancidity of the fat in the ration and the amount of alpha tocopherol present, turkeys require between 22 and 32 milligrams of niacin per pound of ration for the prevention of enlarged hocks.

Dr. J. R. Couch of Texas A and M College reported that methionine gives best results when it is added along with fish meal or fish solubles. When fed at a level of 1/2 to 1 pound per ton of feed, methionine produced an improvement in feed efficiency and a slight improvement in growth. Methionine costing $3.00 per ton of feed was worth $5.00 in value when used alone and $11.90 when fed with fish meal. A paper by B. B. Clowes of the University of Arkansas, concluded that the unidentified growth factor in condensed fish solubles is a vitamin-like factor that is destroyed by boiling and autoclaving under acid or alkaline conditions but not by autoclaving under normal conditions. Fish solubles reportedly furnish a growth factor other than the factors present in antiobiotics or vitamin B_{12}.

6.130 (Cross Reference: 1.2)

Board factory at Wick. Large samples of dried, neutralized protein had been produced for a number of annual feeding trials that are now in progress. The Norwegian workers have continued to cooperate in the study of herring meals and herring solubles. The effect of variations in the quality of the raw material and in the processing conditions from the standpoint of nutritional value should be available soon.

U.S. GOVERNMENT PRINTING OFFICE . 1951 O - 949019

2.1121 PRELIMINARY EXPERIMENTS TO DETERMINE THE WORKING GAPE OF TRAWLING GEAR

K. S. Ketchen
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 88, 62 (October, 1951)

Experiments were carried out by the Pacific Biological Station to observe the spread of the mouth of an otter trawl. The experiments were conducted aboard the Station's research trawler M. V. Investigator which is 60 feet long and is powered by a 165-B.H.P. engine. The net used was an American-type trawl, towed by two winches and suspended by a davit at each quarter of the vessel. (The Canadian-style trawl is towed from a single winch and is suspended from a single davit amidships on the starboard side.) It was of conventional eastern-style design with a groundline measuring 87 feet.

The gape of the trawl was measured by securing floats to the otter boards with cod line and calculating the distance between the floats by triangulation from the stern of the boat.

Two separate experiments were run; one against a four-foot flooding tide and one in the same direction as a fifteen-foot ebbing tide. The engine speed was found to be the most suitable gauge of the speed of the trawl through the water. The results of measurements made at various engine speeds on these two runs are shown on the accompanying graph. At engine speeds of over 1150 r.p.m. in both runs the spread between the otter boards was seen to decrease. This was believed to be due to the raising of the boards off the bottom, where a shearing effect against the bottom was helping to keep them apart at lower speeds. Below the normal towing speed of 1150 r.p.m. the boards spread out to a maximum of 123 feet. At speeds below 1050 r.p.m. progress of the vessel was stopped, apparently by the

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2.12 WHAT'S THE WORD FROM THE "ANTILLAS"?

Anonymous
Southern Fisherman Yearbook (March 31, 1952), p. 133

The research trawler Antillas has successfully completed a period of exploratory fishing off the South Atlantic states at depths between 10 and 200 fathoms. The Antillas is operated in cooperative agreement by the Gibbs Corporation and the U. S. Fish and Wildlife Service. The vessel, the standard equipment and a captain and crew are all furnished by the Gibbs Corporation. C. B. Carlson, Fishery Engineer, represents the U. S. Fish and Wildlife Service aboard the ship and provides technical assistance. The Fish and Wildlife Service also furnishes the experimental gear.

One year of explorations has been planned. The first two months are to be spent in trawling explorations off the South Atlantic states. Depths of 50 fathoms and deeper are to be explored. The second two months will be spent testing new types of fishing gear. Mid-water trawls will be tested in hopes they will be useful in the shrimp, menhaden, mackerel, little tuna and other potential fisheries of the South Atlantic and Gulf States. Another vessel is to be chartered by the Service to operate along with the Antillas in comparing the effectiveness of standard trawls and bottomless trawls. Arrangements have been made with the Navy to borrow underwater television equipment to observe the behavior of the trawls under water and to determine if possible why shrimp are caught more readily at night than at daytime on certain grounds. A third period of two months is to be spent testing the commercial possibilities of the potential fishery for red shrimp recently discovered by the Oregon at depths between 100 and 200 fathoms. These shrimp have been found at various places between Florida and Texas. During this period snag cables towed between the otter boards and rib lines reinforcing the trawl netting will be tested as means of

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2.1121 EXPERIMENTS ON THE ESCAPE OF UNDERSIZED HADDOCK THROUGH OTTER TRAWLS

Clark, John R. (U. S. Fish and Wildlife Service, Woods Hole, Massachusetts)
Commercial Fisheries Review 14, No. 9, 1-7 (September, 1952)

Experiments were conducted by the Woods Hole Laboratory of the Branch of Fishery Biology, U. S. Fish and Wildlife Service, in June 1952 to study further the effect of mesh size on the capture of undersize haddock.

Standard No. 41 otter trawls with bellies of 5-inch mesh (between knot centers) were used. Experiments were made on two sizes of mesh in the cod ends. On the first cruise, cod ends of 4 7/8-inch mesh were used. On the second cruise, the cod ends were increased to 5 1/2-inch mesh. The shrinkage and stretching in use of the two sizes of mesh were measured (Tables 1 and 2, omitted).

In order to capture the small fish that escaped, a cover of fine-mesh shrimp netting was fitted to the upper side of the cod end, extending eight feet beyond the cod end of the trawl and terminating as a small "cover cod end". Bullhide protectors prevented the fish from escaping through the underside of the cod end. Analysis of the results of the paired tows showed that the cover did not in any way hinder the escape of small haddock from the cod end.

In a series of 5 tows with the 4 7/8-inch cod end, during which the size of mesh held close to 3 3/4 inches (inside measurement), a total of 7,268 haddock were taken. Of these, 6,195 were retained in the cod end while 1,053 escaped to be caught in the cover. In 8 tows with the 5 1/2-inch cod end, during which the meshes averaged 4 1/8 inches (inside measurement), 4,384 haddock were taken. Of these, 3,194 were retained and 1,190 escaped through the meshes of the cod end and were caught in the cover. The numbers of

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2.1127 SKIPJACK JUICE LURES TUNA

Anonymous
Pacific Fisherman 50, No. 11, 70 (October, 1952)

Experiments conducted at the University of Hawaii Marine Laboratory show that tuna are strongly attracted by an artifical bait made up of a solution of skipjack.

Results of these tests are said to prove for the first time that tuna can smell. When the solution, which is clear and colorless, was siphoned into the test tanks, all varieties of tuna were attracted and snapped eagerly at the tube through which the solution was being introduced.

One of the main factors standing in the way of further development of Hawaii's tuna industry is the scarcity of live bait. The development of an artifical bait could therefore be a considerable boon to the industry.

Other tests were conducted to determine the effect of a pulsating electric current on tuna. It was also found that tuna are attracted by light of moderate intensity, and sound waves of low frequency.

Tests also were conducted with a shark repellent containing copper acetate, but they were not successful because this chemical also repels tuna.

Before the tests could be started, it was found necessary to paint white baffles in the corners of the tank to prevent the captive tuna from bashing themselves to death.

TRAWLING GEAR EXPERIMENTS

TRAWL MESH SIZE EXPERIMENTS

TRAWLING STUDIES

LIQUID BAIT FOR TUNA

2.1121 (Cross Reference: 9.17)

haddock of various sizes taken in the cod ends and in the covers of the two nets, as well as the percentages of these sizes that were retained in the cod ends are given in the two accompanying tables.

It was concluded that the use of a net with meshes larger than the large one used in these experiments (4 1/8 inches, inside measurement) would result in saving most of the haddock now discarded, and at the same time would retain most of the fish now caught and landed.

Table 3 - Selectivity of the 3¾-Inch (Inside Measurements) Cod End

Gutted Weight	Length[1]	Fish in Cover	Fish in Cod End	Total Caught	Percentage Retained in Cod End
Pounds	Cm.	No.	No.	No.	%
.2	21	14	5	19	26.3
.3	24	74	8	82	9.8
.4	27	102	22	144	17.7
.5	30	276	149	425	37.9
.7	33	388	755	1,143	66.1
.9	36	177	1,377	1,554	88.6
1.2	39	22	1,391	1,413	98.4
1.4	42	-	969	969	100.0
1.7	45	-	661	661	100.0
2.1	48	-	418	418	100.0
2.5	51	-	270	270	100.0
2.9	54	-	90	90	100.0
3.4	57	-	38	38	100.0
3.9	60	-	22	22	100.0
4.5	63	-	12	12	100.0
5.1	66	-	5	5	100.0
5.8	69	-	3	3	100.0
Totals		1,053	6,195	7,268	

1/SIZE GROUPS BY 3 CM. INTERVALS. DUE TO THE METHOD OF RECORDING LENGTHS TO LOWER FULL CM. (E.G., ALL LENGTHS FROM 21.0 CMS. TO 21.9 CMS. ARE RECORDED AS 21 CMS.), AN ADJUSTMENT OF 0.5 CM. MUST BE MADE TO EACH LISTED GROUP LENGTH TO OBTAIN THE TRUE MIDPOINT OF THE GROUP.

Table 4 - Selectivity of the 4-1/8-Inch (Inside Measurements) Cod End

Gutted Weight	Length[1]	Fish in Cover	Fish in Cod End	Total Caught	Percentage Retained in Cod End
Pounds	Cm.	No.	No.	No.	%
.1	18	1	-	1	0.0
.2	21	13	4	17	23.5
.3	24	17	-	17	0.0
.4	27	47	4	51	7.8
.5	30	192	39	231	16.9
.7	33	313	206	519	39.7
.9	36	349	486	835	58.2
1.2	39	211	785	996	78.8
1.4	42	39	627	666	94.1
1.7	45	6	454	460	98.7
2.1	48	2	325	327	99.4
2.5	51	-	154	154	100.0
2.9	54	-	69	69	100.0
3.4	57	-	28	28	100.0
3.9	60	-	11	11	100.0
4.5	63	-	2	2	100.0
Totals		1,190	3,194	4,384	

1/SIZE GROUPS BY 3 CM. INTERVALS. DUE TO THE METHOD OF RECORDING LENGTHS TO LOWER FULL CM. (E.G., ALL LENGTHS FROM 21.0 CMS. TO 21.9 CMS. ARE RECORDED AS 21 CMS.), AN ADJUSTMENT OF 0.5 CM. MUST BE MADE TO EACH LISTED GROUP LENGTH TO OBTAIN THE TRUE MIDPOINT OF THE GROUP.

2.1127 (Cross Reference: 1.1)

2.1121

upright otter boards burrowing into the mud.

The spread of the otter boards is not the only factor that determines the efficiency of an otter trawl. At lower speeds, the fish have more chance to escape. Also, less area is covered in a given period of time although the net is spread wider at these lower speeds.

In comparing the wing-tip to wing-tip spread distances of the American and Canadian type trawls, the American type was found to have a spread of about 45 feet and the Canadian type about 32 feet.

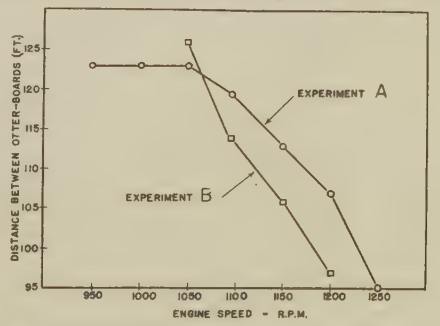


FIG. 2.—A graph showing the relation of engine speed to otter-board spread when the vessel is towing against the tide (Exper. A) and with the tide (Exper. B).

2.12 (Cross Reference: 2.1121)

protecting the trawl against tears. The remaining six months of the year's explorations will be spent in the work that seems to give the most promising results.

Some experiments on trawls have already been run aboard the Antillas by Mr. Carlson. He has found that connecting the trawl float and foot lines to pad eyes on the back side of the otter boards rather than to the trailing edge, as is generally done, increases the spread of the boards by 18 percent.

TABLE 1
METHOD OF ATTACHMENT AND SPREAD OF OTTER BOARDS

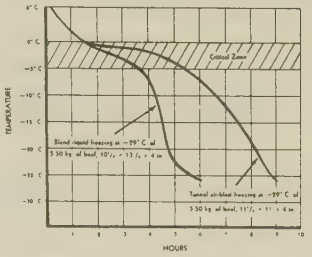
Item	Method of Attachment	Angle Between Boards	Calculated Spread-Foot
1.	Trawl on pad-eyes rear of door Cables towed from stern davits	11° 15′	58.8
2.	Trawl on pad-eyes rear of door Cables towed from hook.....	10° 15′	53.6
3.	Trawl on end of door Cables towed from stern davits	10° 15′	53.6
4.	Trawl on end of door Cables towed from hook.....	8° 40′	45.3

Figure 3. Experimental winch used on "Antillas," having capacity for 800 fathoms of 7/16-inch diameter cable.

3.234 QUICKER-THAN-QUICK FREEZE

Kenyon, Richard L. (Associate Editor)
Industrial and Engineering Chemistry 44, No. 10, 11A-13A (October, 1952)

A new Danish freezing technique makes use of a liquid heat transfer medium to speed the temperature drop in food through the critical zone between 0° and -5°C. Its sponsors claim results sharply improved over those obtained with the air freezing systems now in use. The accompanying figure compares the freezing of a 12-pound cut of beef in liquid medium and in air blast. The time elapsing from the beginning of freezing to the completion of crystal formation is considerably shorter in the liquid medium and the crystals are consequently much finer.



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3.19 SOFT X-RAYS PROMISE STERILIZATION GAINS

Anonymous
Canner 115, No. 18, 12 (November 1, 1952)

"Soft" X-rays, those radiations produced at comparatively low voltage, are said to have unusual ability to penetrate substances and completely destroy spoilage organisms. The incident radiations, together with the secondary radiations produced within the material during absorption, destroy the molds, viruses, and yeasts, as well as the vegetative and spore forms of bacteria or other organisms present in the treated material. Sterilization can be effected at room temperatures, and no preliminary heating or cooling of the materials is necessary to destroy the microorganisms.

The exposure time necessary to destroy the bacteria is decreased from that required with ordinary X-ray equipment by the use of massive dosages of tremendous X-ray flux density. All heat damage is eliminated, and no vitamins or other desirable values are destroyed.

Because this method of sterilization does not require the application of heat or pressure, sterile containers of new and inexpensive materials such as fiber, paper, composition, plastics, thinner metals, and oil may now be used. Products can be sterilized in bulk or in containers.

Where a sturdier container is necessary, glass and the heavier gages of tin or other metals can be used. By increasing irradiation time, such heavily-packaged contents can be sterilized in the container.

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3.230 MEAT CONTENT VARIES IN FROZEN SHRIMP PACKAGES

Fagerson, I. S.; Anderson, E. E.; and Fellers, C. R. (Department of Food Technology, University of Massachusetts)
Quick Frozen Foods 15, No. 3, 51, 125 (October, 1952)

Forty-three brands of commercially prepared shrimp products were recently examined for general quality and actual shrimp meat content. These included frozen, ready-cooked, French-fried shrimp; frozen in shell, headless shrimp; frozen, breaded, ready-to-fry shrimp; and canned wet-pack shrimp.

Six containers of each brand were purchased in retail stores throughout the country and shipped in refrigerated containers to the laboratory where they were kept in 0°F. storage until examined.

In the canned wet pack, the percentage shrimp meat content was defined as the ratio of the drained weight of shrimp to the net weight of can contents.

The actual weight of meat in the frozen, headless shrimp in the shell was calculated by weighing the shrimp before and after removal of the shell. In none of the frozen products were the tails removed.

After weighing the frozen, breaded, French-fried shrimp, the bread crumbs were carefully scraped off. The meats were then weighed to determine the percentage of each.

Bread crumbs from the frozen, ready-to-cook product are not readily removed by scraping alone, and it was necessary to use a gentle water spray to loosen the breading material. The shrimp were then placed between dry towels for approximately five minutes before weighing.

Analysis of the results presented in the accompanying tables shows an extremely wide variation of edible shrimp meat in the different brands of the same type of pack. The authors feel that breading has been "overdone" in many cases and that the consumer should receive at least 60 percent shrimp in any brand purchased.

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3.231 THE ESSENTIALS OF FREEZING-FOR-CANNING

Anonymous
Pacific Fisherman 50, No. 11, 22-23 (October, 1952)

Efficient operating methods and the prompt and careful handling of the fish are the prime requisites for a successful freezership operation in which salmon is being frozen for canning. This has been clearly demonstrated in the freezership operations of the past two years.

The quality of salmon frozen for canning is primarily dependent upon three conditions:

(1) Promptness with which freezing is initiated.
If possible, salmon should be introduced into refrigeration within two hours after catching, and always before rigor mortis has set in. This will insure a quality that has not been impaired by bacterial decomposition or autolytic changes.

(2) Promptness with which freezing is completed.
Rapid accomplishment of complete freezing reduces salt penetration in brine freezing and dehydration of the fish in the case of air-freezing; it eliminates the possibility of in-process spoilage; it results in better flesh structure of the canned product; and it eliminates the problem of fish freezing together in brine tanks.

(3) Sound storage conditions.
The temperature should be sufficiently low and sufficiently constant to inhibit deterioration in storage. The fish should be glzed to prevent dehydration and odixation.

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FREEZING BY LIQUID IMMERSION

MEAT CONTENT IN FROZEN SHRIMP PACKAGES

SOFT X-RAY STERILIZATION

FREEZING SALMON FOR CANNING

3.230 (Cross Reference: 1.85)

SUMMARY COMPARISON OF SHRIMP MEAT CONTENT

No. of Samples		% Shrimp Meat Range %	% Shrimp Meat Average %
18	Frozen, Breaded, French-Fried	42-72	58
108	Frozen Breaded Ready-to-Fry	36-77	57
86	Frozen in Shell (headless)	69-87	79
80	Canned Wet Pack	58-70	63

SHRIMP MEAT CONTENT OF VARIOUS PACKS

Brand No.	% Shrimp Meat Range %	% Shrimp Meat Average %
Frozen, Breaded French-Fried		
1	61-72	68
2	42-57	50
3	57-68	61
Frozen, Breaded, Ready-to-Fry		
4	51-63	57
5	59-69	64
6	53-63	60
7	41-58	53
8	55-65	60
9	53-62	58
10	49-58	55
11	58-64	62
12	42-58	49
13	56-65	60
14	52-64	57
15	41-62	55
16	50-74	62
17	61-69	65
18	47-60	[illegible]
19	57-77	63
20	53-70	67
21	36-49	43
22	45-58	51
Frozen in Shell (headless)		
23	82-87	85
24	80-85	82
25	74-78	77
26	80-87	84
27	72-81	78
28	77-86	82
29	68-75	72
30	72-80	76
31	72-77	75
32	81-85	82
33	80-83	81
Canned, Wet Pack		
34	62-66	65
35	68-70	67
36	57-67	63
37	56-62	59
38	57-65	62
39	64-68	66
40	[illegible]	62
41	59-66	64
42	60-63	61
43	60-66	63

3.231 (Cross References: 2.118, 1.30)

Several requisites are cited for accomplishing the above essentials.

First of these is adequate "hi-side" refrigeration capacity. This may be provided either by the conventional mechanical compression system or by ammonia absorption. The type selected will be determined by considerations of installation cost, operating cost and space requirement, and by technical considerations of supervision and lowness of temperature required.

Velocity and volume of low-temperature brine are just as important in brine freezing as actual refrigeration capacity. In order to assure the steady flow of brine through all the fish being frozen, the freezing tanks must not be overloaded, and there must be adequate pumps or agitators for brine circulation. There must also be a continuous production of low-temperature brine. This requires not only "hi-side" refrigeration capacity but also adequate means for transferring refrigeration to the brine.

In air-freezing, where the large volume of the freezing air reduces the dehydration effect, volume and adequately low temperatures are of prime importance. Dehydration is kept at a minimum when there is a minimum difference in temperature between the refrigerated coils and the fish. This can be accomplished by having large coil surface and rapidly moving air. These same factors determine tonnage capacity for freezing.

Also discussed are the factors for consideration in the selection of a refrigeration system and the principles of the absorption system of refrigeration.

3.234

The heat exchange liquid is a patented solution of distilled water, glycerol, and ethyl alcohol. The food to be frozen is carried in metal baskets through the freezing tank containing the solution at -29°C. until the temperature of the product has reached -5°C., after which it enters an air blast tunnel. The blast, at -29°C., removes adhering liquid and lowers the temperature of the food to -27°C., the desired storage temperature.

While regulations in the United States prohibit the use of ethyl alcohol in contact with food in freezing, the Danish manufacturer points out that in his process the outside surface of the food is frozen so quickly that absorption of the freezing liquid is prevented.

The equipment consists of a freezing tank, air blast tunnel, overhead conveyor with baskets, and standard refrigeration machinery capable of producing the required temperature.

One advantage of the system is that the surface of the food is frozen almost instantaneously, preventing the transfer of smell or taste through the liquid. Mixtures of food such as herring, strawberries, cauliflower, oranges and chicken have been frozen in a single tank without the transfer of flavor.

The sponsors of the technique say that the superior quality of the product and its storage qualities make any direct comparison of costs with air freezing unrealistic. However, estimates based on pilot plant operation are said to indicate that the liquid immersion process is considerably cheaper because of the more efficient transfer of heat.

Loss of weight in the process is said to be negligible, and appearance and flavor remain unchanged.

Herring, which have a tendency to rupture on thawing after conventional quick-freezing in air, have been shown to remain intact after freezing by liquid immersion.

3.19

The potential economies of soft X-ray sterilization are said to be very attractive. The equipment is compact and relatively inexpensive. The tubes have a long life. The apparatus could be used on an automatic production line and would not require a trained X-ray operator.

Because the soft rays can easily be stopped by thin layers of lead and certain other metals, the safety hazards are considered to be negligible. A unit could easily be shielded to prevent any possible injury to working personnel.

1.017 AUSTRALIAN PRAWNING

Farwell, George
Pan-American Fisherman 7, No. 2, 10 (September, 1952)

Deep-sea prawning has been known in Australia only since 1947 when commercial quantities of these shellfish were discovered off the coast of New South Wales. In the record year that ended June 30, 1950, this State's yield reached 2,800,000 pounds, mainly from the ports of Evans Head and Stockton.

Small but sturdy trawlers ranging from 30 to 60 feet are employed in the fishery. Each, as a general rule, carries a captain and a crew of two. Working on a share basis, the captain receives half the proceeds of the catch and the others one quarter each.

The trawling nets are 16 fathoms long with a mesh size from 1 1/2 to 2 inches. The length of tow line varies with the depth of the beds being worked, the general practice being to run out three times as much wire as would be needed to reach the bottom vertically. Most of the prawns in Australian waters are the smaller school prawns (Peneopsis macleaya) which are found in fairly shallow water near the coast. The king prawns (Peneus plebejus) are found in 30 fathoms. The length of the catching season is generally accepted as lasting between eight and nine months.

The king prawn measures up to seven and eight inches long; the school prawn averages about five inches. New South Wales Fisheries Department regulations prohibit the taking of prawns less than four inches in length. When cooked, the king prawn becomes a deep red, while the school prawn is pink.

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 ABSTRACTER: Roy C. Stevens

3.234 WHALING PROSPERS ONCE AGAIN: (PRODUCTION OF WHALE MEAT)

Anonymous
Fishing Gazette 69, No. 10, 40, 70 (October, 1952)

A whaling plant located near Durban, South Africa has developed a flourishing business in the production of whale meat for human consumption.

When the blubber, destined for rendering, has been cut from the whale carcasses, certain edible sections of the meat are removed for processing. Because the meat has an extremely fine texture, it cannot be hooked and hung on rails in the freezer. Hooks will pull through the delicate fibers of the meat. To overcome this difficulty, whale steak is cut into 18-inch cubes, wrapped in mutton cloth and stacked onto shelves in the main freezing room.

This freezing room has a capacity of approximately 2,000 cubic feet to accommodate the large quantities of meat. A temperature of -5°F. is maintained by a steel pipe type evaporator that has sufficient capacity to reduce the room to this temperature in about six hours and to hold it at this low temperature with a full load. The freezing room is usually loaded with fresh meat each afternoon during the whaling season, and when the product is frozen, it is transferred to a large storage room.

An 800-cubic-foot storage room is provided for the preservation of whale meat to be used in the manufacture of sausages and balogna. The temperature of this space is held between 33 and 35 degrees F. A third room of approximately 1,000 cubic feet is used to store finished products prior to shipment.

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 ABSTRACTER: Roy C. Stevens

7.641 COMPARISON OF METHODS FOR DETERMINATION OF THE VITAMIN B_{12} POTENCY OF MEATS

Scheid, Harold E.; Andrews, Mona M.; and Schweigert, B. S. (American Meat Institute Foundation and Department of Biochemistry, University of Chicago)
Journal of Nutrition 47, No. 4, 601-610 (August 11, 1952)

The vitamin B potency of fresh and cooked meats was determined by the rat growth method, by liver storage of the vitamin and by microbiolgical methods.

For the rat assay, a corn-soybean oil meal basal diet plus 0.06% iodinated casein was satisfactory. A graded growth response was obtained with increased levels of vitamin B_{12} and the mortality was low. After a two-week depletion period, the rats were divided into groups of seven. Crystalline vitamin B_{12} was added to the basal diet of the control animals at levels of 0, 2, 6, 9, 15, or 24 μg. per kilogram ration.

After completion of a rat growth experiment, the animals from selected groups were sacrificed. The livers were removed and assayed microbiologically using Lactobacillus leichmannii 327. The vitamin B_{12} potency of the samples was calculated from the results obtained from the livers of rats fed graded levels of vitamin B_{12}.

The vitamin B_{12} potency of the test samples was determined microbiologically after enzymatic treatment. However, for the vitamin B_{12} in the beef liver, the assay utilized Euglena gracilis.

Extraneous fat and connective tissue were removed from samples of beef liver, kidney, round or rib cuts, fresh ham and lamb leg. The samples were thoroughly ground and stored at -5°C.

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 ABSTRACTER: Neva L. Karrick

7.81 INDOLE AS AN INDEX OF DECOMPOSITION IN DUNGENESS CRAB

Williams, David W. (Food and Drug Administration, Federal Security Agency, San Francisco 2, California, Associate Referee)
Journal of the Association of Official Agricultural Chemists 35, No. 3, 525-526 (August 15, 1952)

The presence of indole in decomposed shrimp was found by Duggan and Strasburger to be a good index of decomposition. There was also some indication that decomposed crabmeat prepared from the blue crab (Callinectes sapidus) contained indole.

This year's project included the analysis by the Associate Referee of two experimental packs of canned Dungeness crab (Cancer magister) for indole (a total of 28 determinations) using the A.O.A.C. method, and some studies on the applicability of the method to this species.

One experimental pack was prepared from crabs decomposed in the shell under various conditions of temperature and time, in the shell after killing the crabs, and crabs decomposed after picking. Each type of spoilage was canned separately. Separate packs of good, decomposed, advanced decomposed, and putrid crabmeat from each type of spoilage were prepared, with no citric acid dip and with citric or acetic acid dips of different durations.

The other experimental pack was prepared from crabmeat progressively spoiled as picked meat or as butchered uncooked crabs. Packs were made from the four stages of resulting decomposition with no acid dip, with a citric acid dip, or with an acetic acid dip of two different concentrations.

(over)

 Reprinted in whole

AUSTRALIAN PRAWNING

DETERMINATION OF VITAMIN B_{12} IN MEATS

PRODUCTION OF WHALE MEAT

INDOLE AS SPOILAGE INDEX IN CRAB

7.641

The results indicated that beef liver contained 20 to 50 times and kidney 10 times as much vitamin B_{12} as did muscle cuts. Beef and lamb muscle cuts contained somewhat greater quantities than the pork muscle.

Three paired cuts were tested for stability of vitamin B_{12} during cooking. The retention of vitamin B_{12} during cooking was 70% or more.

In studies comparing the different methods, results obtained for the rat and the microbiological assays were in good agreement for beef and pork muscle cuts, but results by the rat growth and liver storage assay were considerably higher for lamb leg, beef liver, and beef kidney. There was general agreement in the values obtained by rat growth and liver storage tests. Limitations of the methods are discussed.

Table 2

Comparison of rat growth and liver storage using microbiological assay for vitamin B_{12}[1]

Sample	Sample No.	% Protein	Animal Assay		Micro-Biological
			Growth	Liver storage	
			μg B_{12}/100 gm-fresh basis		
Pork ham	36	17.90	1.6	2.5	0.9
Beef round	35	21.41	4.2	7.3	1.3
Beef liver	48	21.58	120	200	40.9
Beef kidney	47	15.66	55	54	18.5
Lamb leg	46	17.59	6.6	3.4	1.7
Beef rib	133	16.85	2.5		2.9
Beef rib (cooked)	134	19.65	4.4		2.7
Beef liver	138	21.17	>500		99
Beef kidney	137	14.76	40		14.6
Liver extract			13.0[2]		15.5[2]

[1]--The rat assay in experiments 1 and 2 was conducted for three weeks and in experiment 3 for 4 weeks. [2]--Micrograms per milliliter.

7.81

In the first pack no indole was found in Stage 0 crabmeat and the indole did not exceed 5 mmg/100 g in Stage 3 crabmeat (advanced decomposed). In the second pack analyzed, no indole was found in Stage 1 crabmeat, and amounts of indole in the range of 0-21 mmg/100 g were found in Stage 3 crabmeat.

Difficulty was experienced with foaming in the distillation and this greatly extended the time of analysis. This difficulty was corrected by using a silicone antifoam (D. C. Antifoam A). Standards and blanks were run using the antifoam and it was found to have no effect on the results.

1.017 (Cross Reference: 1.85)

Despite the intense fishing activity, there are as yet no signs of the depletion of this fishery resource. During 1951 the 60 fishing boats owned by members of the Newcastle and District Fishermen's Cooperative grossed some £A 200,000 -- $448,000 -- 80 percent of which was for prawns alone. The Evans Head Cooperative with 40 share-holders made gross earnings of £A 110,000 -- $240,000 -- in the same 12-month period.

During the off-season for prawns, fishermen return to trawling for snapper, flathead, flounder, leatherjacket and other species. Crayfish are also caught in traps in lesser quantities.

The average investment in trawling vessel and nets amounts to £A 3,000 -- $6,720. Fishing has proved so good in recent years that the net return for the first twelve months of operation has usually covered this initial investment.

3.234 (Cross Reference: 1.95)

Whale meat has been accepted by people in many parts of the world as a delicacy. It is much like beef in appearance, but has a finer texture. However, because it decomposes at a faster rate, whale meat must be frozen as soon as possible after butchering.

0.35 OXIDATION OF UNSATURATED FAT AND FATTY ACIDS

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 27 (1952)

(Abstract of this article appears under 4.21 page 7)

0.36 PHYSIOLOGY AND BIOCHEMISTRY OF MUSCLE

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 14-15 (1952)

(Abstract of this article appears under 2.02 page 5)

0.37 STUDIES ON BOUND WATER IN FISH MEAT MUSCLE (II)

Akiba, Minoru
Bulletin of the Faculty of Fisheries, Hokkaido University 2, No. 3, 176-213 (December, 1951)

(Abstract of this article appears under 7.43 page 1 - December, 1952 issue)

0.6 EFFECT OF SUBTILIN ON SPOILAGE OF THERMAL PROCESSED BEEF

Adams, A. T.; Ayres, J. C.; Tischer, G. R. and Ostle, B. (Iowa State College, Ames, Iowa)
Food Technology 6, No. 11, 421 (November, 1952)

A combination of a high level of subtilin with heat processing apparently is necessary for extended inhibition of heat resistant spores in beef.

1.0112 MID-OCEAN CHALLENGE

Anonymous
Pacific Fisherman 50, No. 11, 15-16 (October, 1952)

(Abstract of this article appears under 1.1 page 3)

1.013 VENEZUELA ESTABLISHES NEW SCHOOL FOR FISH SALTING

Anonymous
Foreign Commerce Weekly 48, No. 15, 18 (October 13, 1952)

(Abstract of this article appears under 3.5 page 9).

1.1 ELECTRIC TUNA FISHING

Anonymous
Atlantic Fisherman 33, No. 9, 9 (October, 1952)

(Abstract of this article appears under 2.14 page 1)

1.1 SKIPJACK JUICE LURES TUNA

Anonymous
Pacific Fisherman 50, No. 11, 70 (October, 1952)

(Abstract of this article appears under 2.1127 page 15)

1.1 EXPLORATORY FISHING FOR THE LITTLE TUNA (EUTHYNNUS ALLETTERATUS) OFF THE ATLANTIC COAST OF THE UNITED STATES

Carlson, C. B.
Proceedings of the Gulf and Caribbean Fisheries Institute, Fourth Annual Session, 89-94 (April, 1952)

(Abstract of this article appears under 2.12 page 5)

1.2 FISH BY-PRODUCTS

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 25-26 (1952)

(Abstract of this article appears under 6.130 page 13)

1.30 THE ESSENTIALS OF FREEZING-FOR-CANNING

Anonymous
Pacific Fisherman 50, No. 11, 22-23 (October, 1952)

(Abstract of this article appears under 3.231 page 17)

1.5 MOISTURE CURVES FOR LIGHT-SALTED COD

Dingle, J. R.
Fisheries Research Board of Canada, Prog. Repts., Atl. Coast Stas., No. 53, 8-9 (April, 1952)

(Abstract of this article appears under 3.5 page 9)

1.83 PRELIMINARY INVESTIGATION OF THE SOUTHEASTERN ALASKA ABALONE (HALIOTIS KAMTSCHATKANA)

Livingstone, Robert Jr.
Commercial Fisheries Review 14, No. 9, 8 (September, 1952)

1.85 MEAT CONTENT VARIES IN FROZEN SHRIMP PACKAGES

Fagerson, I. S.; Anderson, E. E.; and Fellers, C. R.
Quick Frozen Foods 15, No. 3, 51, 125 (October, 1952)

(Abstract of this article appears under 3.230 page 17)

1.85 AUSTRALIAN PRAWNING

Farwell, George
Pan-American Fisherman 7, No. 2, 10 (September, 1952)

(Abstract of this article appears under 1.017 page 19)

1.85 STUDIES ON BLACK SPOTTED SHRIMP

Fieger, E. A.
Proceedings of the Gulf and Caribbean Fisheries Institute, Fourth Annual Session, 79-82 (April, 1952)

(Abstract of this article appears under 2.00 page 5)

1.85 COMMERCIAL SHRIMPS OF THE PACIFIC

Anonymous
Trade News 5, No. 3, 5 (September, 1952)

1.9 STUDIES ON THE COMPLETE UTILIZATION OF SQUID (OMMASTREPHES SLOANI PACIFICUS) V. NUTRITIVE AND DIGESTIBILITY OF SQUID MEAT

Tanikawa, Eiichi and Suno, Masami
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 75 (May, 1952)
(In Japanese with English summary and tables)

1.9 METHODS OF CAPTURING FLYING FISH

Wiles, D. W.
Proceedings of the Gulf and Caribbean Fisheries Institute, Fourth Annual Session, 99-101 (April, 1952)

(Abstract of this article appears under 2.14 page 1)

1.95 WHALING PROSPERS ONCE AGAIN! (PRODUCTION OF WHALE MEAT)

Anonymous
Fishing Gazette 69, No. 10, 40, 70 (October, 1952)

(Abstract of this article appears under 3.234 page 19)

2.00 VARIATION OF AMMONIA CONTENTS IN FISH MEAT BY HEATING UNDER PRESSURE. RELATION BETWEEN THE INCREASE OF AMMONIA AND THE FRESHNESS OF FISH

Ota, Fuyuo and Nakamura, Tatsuro
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 1, 15 (August 10, 1952)
(In Japanese with English summary, tables and figures)

2.00 PRESERVATIVE EXPERIMENT OF SMOKED SHARK FILLET. III. PRODUCTION OF AMMONIA

Yamamura, Y.
Bulletin of the Japanese Society of Scientific Fisheries 16, 513-517 (1951) (Summary in English)

"Bacterial action plays a more important part in the production of ammonia in smoked shark (aburazame) fillet than does autolysis. Formation of ammonia increased rapidly once growth of mould had occurred."

2.00 ON THE AUTOLYTIC AND BACTERIAL DECOMPOSITION OF PROTEIN IN FRESH AND SALTED COD FLESH

Winter, H.
Dtsch. Lebensmitt.-Rdsch. 46, 210-213 (1950)

"It is concluded that the salting of cod flesh inhibits the decomposition of the fish significantly, in so far as proteolytic breakdown is concerned."

2.00 CHEMICAL STUDY ON PUTREFACTION OF FISH MUSCLE. II. INFLUENCES OF PUTREFYING CONDITIONS ON THE DECOMPOSITION PRODUCTS

Higashi, H.; Okada, M. and Yamada, J.
Bulletin of the Japanese Society of Scientific Fisheries 16, 377 (1951)

2.00 STUDIES ON THE PUTREFACTION OF THE AQUATIC PRODUCTS. I. THE MECHANISM AND THE SPECIALITY OF DEVELOPMENT OF AMMONIA IN THE SHARK MUSCLE

Simidu, W. and Oisi, K.
Bulletin of the Japanese Society of Scientific Fisheries 16, 423 (1951)

2.01 BACTERIOLOGY OF FISH

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 26 (1952)

(Abstract of this article appears under 0.5 page 11)

2.06 CHEMICAL STUDY ON PUTREFACTION OF FISH MUSCLE. III. MANUFACTURE OF FOOD YEAST FROM PUTREFIED FISH

Higashi, H.; Okada, M. and Yamada, J.
Bulletin of the Japanese Society of Scientific Fisheries 16, 443-446 (1951)

2.111 AN EXPERIMENT ON THE PRESERVATION OF NETTING CORD

Honda, Katsuji
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 1, 9 (August 10, 1952)
(In Japanese with English summary, tables, and figures)

2.111 ON THE EFFICACY OF NET PRESERVATIVES

Kawasaki, Giichi and Ueno, Motokazu
Bulletin of the Faculty of Fisheries, Hokkaido University 2, No. 1, 81 (June, 1951)
(In Japanese with English summary, tables, and figures)

"Preserving efficacy of tannin material contained in 'Donguri' Quercus acutissima for net were proven to be not good."

2.111 ON THE EFFICACY OF NET PRESERVATIVES (3)

Kawasaki, Giichi; Nishiyama, Sakuzo and Nakamura, Hideo
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 109 (May, 1952)
(In Japanese with English summary)

2.111 STUDIES ON FISH NET PRESERVATION BY COPPER SULFATE. I. A SIMPLE DETERMINATION OF COPPER SULFATE

Migita, Masao; Matsumoto, Juichiro; and Satomi, Yoshihiro
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 1, 78 (August 25, 1952)
(In Japanese with English summary and figures)

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Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
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Fisheries Newsletter (Australia)
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Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fisherman
Fishermen's News
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Technology
Foreign Commerce Weekly
Frosted Food Field
Ice and Refrigeration
Industrial and Engineering Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Modern Packaging
Modern Refrigeration
Modern Sanitation
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan-American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Seafood Business
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Canner and Packer
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

2.1120 FUNDAMENTAL STUDIES ON SPHERICAL GLASS FLOATS FOR FISHING NETS (PRELIMINARY REPORT)

Kobayashi, Kiichiro; Takahashi, Hiroya and Ueno, Motoichi
Bulletin of the Faculty of Fisheries, Hokkaido University 1, No. 2, 102 (February, 1951)
(In Japanese with English summary, tables, and figures)

2.1121 WHAT'S THE WORD FROM THE "ANTILLAS"?

Anonymous
Southern Fisherman Yearbook (March 31, 1952), p. 133

(Abstract of this article appears under 2.12 page 15)

2.1121 STUDY ON FISHING TRAWL OPERATED IN ANY DEPTH OF SEA-WATER

Kobayashi, Kiichiro and Takahashi, Hiroya
Bulletin of the Faculty of Fisheries, Hokkaido University 1, No. 3-4, 139 (March, 1951)
(In Japanese with English summary, figure and table)

2.1121 A STUDY ON FISHING TRAWL OPERATED IN ANY DEPTH OF SEA-WATER (CONTINUED). ON THE RELATIONS BETWEEN THE LENGTH OF WARP AND THE FRONTAGE OF OTTER-BOARD

Kobayashi, Kiichiro and Takahashi, Hiroya
Bulletin of the Faculty of Fisheries, Hokkaido University 2, No. 1, 86 (June, 1951)
(In Japanese with English summary, table and figures)
"A theoretical equation on the relations between the length of warp and the frontage of otter-board has been deduced from horizontal equilibrium."

2.114 SUCTION HOSE HARVESTS SARDINES

Anonymous
Fish Meal and Oil Industry 4, No. 8, 6 (August, 1952)

2.114 STEAM, DIESEL OR DIESEL-ELECTRIC: ECONOMICS OF TRAWLER PROPULSION

McLay, Colin S. (Hall, Russell & Co., Ltd.)
World Fishing 1, No. 6, 191 (September, 1952)

2.114 BRAILING TRAP SALMON BY PUMP IS TRIED

Anonymous
Pacific Fisherman 50, No. 10, 73 (September, 1952)

It is reported that the device takes fish aboard the packer at about the same speed as the conventional brailing net method.

2.115 ECONOMIC SPEED AND SIZE OF MOTOR FISHING VESSELS

Laas, W.
Hansa 88, (No. 1/2), 112 (1951)

2.118 THE ESSENTIALS OF FREEZING-FOR-CANNING

Anonymous
Pacific Fisherman 50, No. 11, 22-23 (October, 1952)

(Abstract of this article appears under 3.231 page 17)

2.118 FREEZING AT SEA

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 24 (1952)

(Abstract of this article appears under 3.231 page 9)

2.12 MID-OCEAN CHALLENGE

Anonymous
Pacific Fisherman 50, No. 11, 15-16 (October, 1952)

(Abstract of this article appears under 1.1 page 3)

2.14 STUDIES ON THE FISH ALLURING-LIGHTS. 1. SOME NOTES ON THE PRESENT STUDIES

Miura, Tetsuo
Bulletin of the Faculty of Fisheries, Hokkaido University 1, No. 3-4 142 (March, 1951)
(In Japanese with English summary, table, and figures)

3.19 STUDIES ON THE MANUFACTURE OF CONSERVATIVE MARINE FOOD PRODUCTS. XI. PRESERVATION OF MARINE FOOD PRODUCTS BY THE MEMBRANE

Tanikawa, Eiichi; Fukuda, Masahiko and Akiba, Minoru
Bulletin of the Faculty of Fisheries, Hokkaido University 1, No. 2, 166 (September, 1951)
(In Japanese with English summary and tables)

"The authors have tried to preserve the marine foods by the productions of a membrane of latex attached to the surface of the foods."

3.249 THE INFLUENCE OF RATE OF FREEZING AND LENGTH OF FREEZER STORAGE UPON THE QUALITY OF BEEF OF KNOWN ORIGIN

Pearson, A. M. and Miller, J. I.
Journal of Animal Science 9, 13-19 (1950)

3.29 VITAMIN LOSSES IN DRIP FROM FROZEN-DEFROSTED BEEF

Pearson, A. M.; Edwards, H. M.; Burnside, J. E.; Novak, A. F.; Glasscock, R. S. and Cunha, T. J.
Journal of Animal Science 9, 644-645 (1950)

3.30 THE CHARACTERIZATION OF THE COVERING OILS IN CANNED FISH

Hadorn, H. and Jungkunz, J.
Mitt. Lebensmitteluntersuch. Hyg., Bern, 40, 202 (1949)

3.30 STUDIES ON THE COMPLETE UTILIZATION OF SQUID (OMMASTREPHES SLOANI PACIFICUS) IV. A MANUFACTURE OF SEASONED CANNED SQUID MEAT CALLED "TOMOENI"

Inoue, Yasunosuke and Tanikawa, Eiichi
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 73 (May, 1952)
(In Japanese with English summary)

3.33 THE HEADSPACE TESTER FOR ROUTINE INSPECTION OF CANNED FISH

Dreosti, G. M. and LeRoux, G. J.
Fish. Ind. Res. Inst., Cape Town, South Africa, Memo. No. 36 (1951)

3.33 ON A CERTAIN NON-LINEAR PROBLEM OF THERMAL CONDUCTION IN A FLAT CAN

Fujita, Hiroshi
Bulletin of the Japanese Society of Scientific Fisheries 17, No. 12, 393 (1952)
(In Japanese with English summary)

3.33 CHEMICAL STUDIES ON THE HOKKIGAI-MEAT (MACTRA SACHALINENSIS SCHRENGK) II. ON THE BLACKENED MEAT OF CANNED HOKKI-GAI

Motohiro, Terushige
Bulletin of the Faculty of Fisheries, Hokkaido University 2, No. 3, 231 (December, 1951)
(In Japanese with English summary, figure, and tables)

3.33 STUDIES ON THE CAUSE OF THE SPRINGER OF CANNED SALMON

Tanikawa, Eiichi and Inoue, Yasunosuke
Bulletin of the Faculty of Fisheries, Hokkaido University 1, No. 2, 118 (September, 1951)
(In English)

3.33 STUDIES ON THE MANUFACTURE OF CANNED MACKEREL. PART II. RELATIONS BETWEEN THE FRESHNESS OF MACKEREL MEAT AND THE QUALITY OF THE CANNED PRODUCT

Tanikawa, Eiichi; Akiba, Susumu; Inoue, Yasunosuke; Akiba, Minoru and Motohiro, Terushige
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 7 (May, 1952)
(In Japanese with English summary and tables)

3.33 STUDIES ON THE MANUFACTURE OF CANNED MACKEREL. PART III. RELATIONS BETWEEN QUALITY OF CANNED MACKEREL AND THE LEAVING TIME BEFORE RETORTING (STERILIZATION) AFTER THE CANS HAVE BEEN SEAMED

Tanikawa, Eiichi; Inoue, Yasunosuke; Akiba, Susumu; Akiba, Minoru; and Motohiro, Terushige
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 13 (May, 1952)
(In Japanese with English summary and tables)

3.33 STUDIES ON THE MANUFACTURE OF CANNED MACKEREL. PART IV. STUDIES ON DEFORMATION OF SHAPE OF THE CONTENT IN THE CANNED MACKEREL

Tanikawa, Eiichi; Inoue, Yasunosuke and Numakura, Tadahiro
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 18 (May, 1952)
(In Japanese with English summary and tables)

3.33 STUDIES ON THE MANUFACTURE OF CANNED MACKEREL. PART V. STUDIES ON THE FORMATION OF CURD IN CANNED MACKEREL

Tanikawa, Eiichi; Inoue, Yasunosuke; Akiba, Minoru; and Numakura, Tadahiro
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 22 (May, 1952)
(In Japanese with English summary, tables and figures)

"The way to prevent the formation of the curd is as follows: Dressing the raw material of mackerel, and cutting in round slices to the depth of the cans, the meat must be steeped in 13 to 15% NaCl solution for 25 - 30 minutes and then washed with water, packed in the cans, passed through the steam exhaust box and sterilized, or seamed by vacuum seamer and sterilized."

3.33 BACTERIOLOGICAL STUDIES ON CANNED CRAB. I. BACTERIOLOGICAL STUDIES ON THE SWELLING OF CANNED CRAB

Inoue, Yasunosuke and Tanikawa, Eiichi
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 95 (May, 1952)
(In Japanese with English summary)

"The author has confirmed the cause of swelling of the canned crab by reinoculating isolated bacteria resembling Bac. mesentericus vulgatus."

3.338 CELLOPHANE LINERS FOR CRAWFISH CANS

Van der Merwe, R. P.
Fish. Ind. Res. Inst. Cape Town, South Africa, Progress Rep. No. 11, 1 (1950)

3.4 METHODS OF HERRING PRESERVATION

Anonymous
Food Manufacture 27, No. 9, 368 (September, 1952)

(Abstract of this article appears under 3.249 page 3)

3.4 STUDIES ON THE MANUFACTURE OF CONSERVATIVE MARINE FOOD PRODUCTS. VII. THE AMOUNT OF FORMALDEHYDE PERMEATING INTO THE FISH MUSCLE BY LIQUID SMOKING AND THE PRESERVATIVE EFFECTS

Tanikawa, Eiichi; Akiba, Minoru and Imai, Goro
Bulletin of the Faculty of Fisheries, Hokkaido University 2, No. 1, 51 (June, 1951)
(In Japanese with English summary and tables)

"When the fish was immersed into the 1:15 diluted wood vinegar, then the amount of formaldehyde which permeated into the fish muscle was about the same as by the usual cold smoking method."

3.4 PRESERVATION EXPERIMENT OF THE SMOKED SHARK FILLET. I. RELATION BETWEEN THE DAYS NEEDED TO SHOW DECAYED APPEARANCE AND THE TEMPERATURE STORED

Yamamura, Y.
Bulletin of the Japanese Society of Scientific Fisheries 16, 433-434 (1951) (Summary in English)

"The rate of decay of smoked fillets of shark (aburazame, Squalus sucklevi) is linearly related to the logarithm of the temperature of storage, over the range 8° to 32°C. Storage at 2° to 8°C. is recommended."

4.14 STUDIES ON PORPOISE BODY-OILS I.

Takaoka, Michio and Tuzino, Isami
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 1, 58 (August 25, 1952)
(In Japanese with English summary, tables, and figures)

4.20 THE REGENERATION OF SQUALENE FROM ITS SOLID HEXAHYDROCHLORIDE

Dauben, William G.; Bradlow, H. Leon; Freeman, N. K.; Kritchevsky, David; and Kirk, Martha
Journal of the American Chemical Society 74, No. 17, 4321 (September 5, 1952)

4.4 PRESERVATION EXPERIMENT OF SMOKED SHARK FILLET. II. CHANGE OF OIL COMPONENTS

Yamamura, Y.
Bulletin of the Japanese Society of Scientific Fisheries 16, 510-512 (1951) (English summary)

"The iodine value and peroxide number of the oil of smoked shark (aburazame) fillet showed no change during 3 month's preservation. The acid value of the oil increased rapidly when growth of mould began."

4.8 THE FISH OIL SITUATION

Coburn, John F.
Fish Meal and Oil Industry 4, No. 8, 8-10 (August, 1952)

(Abstract of this article appears under 4.7 page 7)

6.132 ALKALINE HYDROLYSIS OF FISH PROTEINS

Anonymous
Report of the Food Investigation Board (Great Britain) For The Year 1950, 26-27 (1952)

Fractionation of the hydrochloric acid soluble proteins of herring muscle tissue gave 73 percent fibrillar proteins, 24 percent sarcoplasmic proteins, and 3 percent stroma proteins.

6.138 DISTILLING FATTY ACIDS . . . WHALE OIL BASE

Anonymous
Chemical Engineering 59, No. 10, 328 (October, 1952)

6.23 STUDIES ON THE EXTRACTION OF FISH LIVER OIL. III. THE EXTRACTION OF OIL FROM FISH LIVERS CONTAINING LOW VITAMIN A UNIT

Murata, Kiichi and Suzuki, Matsuo
Bulletin of the Faculty of Fisheries, Hokkaido University 2, No. 4, 273 (February, 1952)
(In Japanese with English summary and tables)

6.3 STUDIES ON THE PREPARATION AND THE UTILIZATION OF ALGINIC ACID DERIVATIVES. II. THE CONDENSATE OF ALGINIC ACID HYDROLYSATE AND VARIOUS FATTY ACIDS AS AN EMULSIFIER

Abe, Yoshiro and Ihara, Toyoxo
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 1, 51 (August 25, 1952)
(In Japanese with English summary and tables)

8.50 CHEMICAL STUDIES ON THE HOKKIGAI-MEAT (MACTRA SACHALINENSIS SCHRENCK). I. ON THE PROXIMATE COMPONENTS OF MACTRA SACHALINENSIS MEAT

Motohiro, Terushige
Bulletin of the Faculty of Fisheries, Hokkaido University 2, No. 2, 151 (September, 1951)
(In Japanese with English summary and tables)

"The total weight of the meat of the shellfish was divided 41% in foot, 27% in viscera, 21% in mantle-cord and gills, and 10% in viscera, and also 10% in ligament."

8.50 STUDIES ON THE MANUFACTURE OF CANNED MACKEREL. PART I. COMPARISON OF CHEMICAL COMPONENTS OF MEAT OF MACKEREL CAUGHT RESPECTIVELY IN THE JAPAN SEA AND IN THE PACIFIC OCEAN OFF THE HOKKAIDO COAST

Tanikawa, Eiichi; Akiba, Minoru and Motohiro, Terushige
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 1, 1 (May, 1952)
(In Japanese with English summary, table and figure)

8.51 THE CONTENT OF METHIONINE, CYSTINE, TYROSINE, TRYPTOPHAN, HISTIDINE AND NON-PROTEIN ACCESSORY SUBSTANCES IN DRIED PROTEIN FROM FRESHWATER FISH

Schormuller, J.; Winter, H.; and Ballschmieter, H.
Biochem. Z. 321, 180-188 (1950)

The amino acids in the proteins of several kinds of freshwater fish were examined. Methionine was found to be present in a relatively high concentration (2.35%). This would indicate the considerable nutritional value of this kind of protein.

9.10 ANNUAL REPORT OF THE FISHERIES RESEARCH BOARD OF CANADA, 1951

Reed, G. B. and Dymond, J. R.
Annual Report of the Fisheries Research Board of Canada, 1951, 185 pages (March, 1952)

(Abstract of this article appears under 0.6 page 11)

9.12 FORECASTING A HERRING FISHERY

Hodgson, W. C. (Fisheries Laboratory, Lowestoft)
World Fishing 1, No. 6, 196-200 (September, 1952)

The article discusses the data needed to obtain a forecast of herring abundance, and indicates that further research will soon enable forecasters to establish not only the availability of fish, but also their condition.

9.17 EXPERIMENTS ON THE ESCAPE OF UNDERSIZED HADDOCK THROUGH OTTER TRAWLS

Clark, John R.
Commercial Fisheries Review 14, No. 9, 1-7 (September, 1952)

(Abstract of this article appears under 2,1121 page 15)

9.19 REACTIONS OF THE PORPOISE TO ULTRASONIC FREQUENCIES

Kellogg, W. N. and Kohler, Robert (Oceanographic Institute, Florida State University, Tallahassee)
Science 116, No. 3010, 250 (September 5, 1952)

U.S. GOVERNMENT PRINTING OFFICE : 1951 O - 949019

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